THE
AMERICAN
NATURAL
HISTORY
&
HORNADAY

THE AMERICAN NATURAL HISTORY

FIRESIDE EDITION

VOLUME II—MAMMALS (CONCLUDED)—BIRDS

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Painted by Carl Rungius.

WHITE-TAILED DEER IN THE ADIRONDACKS.

THE AMERICAN NATURAL HISTORY

A FOUNDATION OF USEFUL KNOWLEDGE OF THE HIGHER ANIMALS OF NORTH AMERICA

BY

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ILLUSTRATED BY 225 ORIGINAL DRAWINGS BY BEARD, RUNGIUS, SAWYER, AND OTHERS, 151 PHOTOGRAPHS, CHIEFLY BY SANBORN, KELLER, AND UNDERWOOD, AND WITH NUMEROUS CHARTS AND MAPS

WITH SIXTEEN PLATES IN COLOR

FIRESIDE EDITION

VOLUME II—MAMMALS (CONCLUDED)—BIRDS .

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MAMMALS
(CONCLUDED)

CHAPTER VIII

ORDER OF HOOFED ANIMALS

UNGULATA

THE Order which includes the hoofed animals of the world is called Un-gu-la'ta, a Latin word which means "hoofed." In North America, it is represented by a great variety of forms, several of which are of special importance.

Before seeking to become acquainted with these animals, the reader must pause long enough to gain a bird's-eye view of the groups into which they are divided, and thereby understand their relationships, clearly and correctly.

The following diagram of arrangement is very simple, and the animals it sets forth are in some respects the most important in America.

THE GROUPS OF NORTH AMERICAN HOOFED ANIMALS

Order Ungulata

FAMILIES	GROUPS	EXAMPLES
CATTLE AND SHEEP FAMILY, OR BOVIDAE...	*Cattle*..	American Bison: Buffalo.....*Bos americanus.*
	Sheep-Cattle..	Musk-Ox.....*Ovibos moschatus.*
	Sheep..	Big-Horn.....*Ovis canadensis.*
		White Sheep.....*Ovis dalli.*
		Black Sheep.....*Ovis stonei.*
	Goat.....	Mountain Goat.....*Oreamnos montanus.*

FAMILIES	GROUPS	EXAMPLES
ANTELOPE FAMILY, OR ANTILOCAPRIDAE	.....	Prong-Horned Antelope ..... *Antilocapra americana.*
DEER FAMILY, OR CERVIDAE	*Round-Horned Groups.*	Elk, or Wapiti ..... *Cervus canadensis.*
		White-Tailed Deer .. *Odocoileus virginianus.*
		Mule Deer ..... *Odocoileus hemionus.*
		Black-Tailed Deer .. *Odocoileus columbianus.*
	Flat-Horned Groups.	Barren-Ground Caribou ..... *Rangifer arcticus.*
		Woodland Caribou .. *Rangifer caribou.*
		Moose ..... *Alces americanus.*
PECCARY FAMILY, OR TAYASSUIDAE	.....	Collared Peccary .... *Tayassu tajacu.*
TAPIR FAMILY, OR TAPIRIDAE	.....	Dow's Tapir ..... *Tapirus dowi.*

THE CATTLE AND SHEEP FAMILY

Bo'vi-dae

GENERAL CHARACTERS.—The Cattle Family of the world contains a grand array of large animals, such as the wild cattle, bison, buffalo, musk-ox, mountain sheep, ibex and wild goats. There are about fifty species in all, scattered over all continents save South America and Australia. All the members of this Family have divided hoofs and simple horns (*i. e.*, not branching) consisting of a hollow sheath growing over a pointed core of very porous bone. The horns grow until the animal reaches old age, and are never shed. If knocked off by accident, the new horn material presently covers the horn core, but never succeeds in forming a perfect weapon like the original. Such a growth is called a "crumpled" horn. The members of this Family eat vegetable food, preferably grass and herbage, and have no upper front teeth.

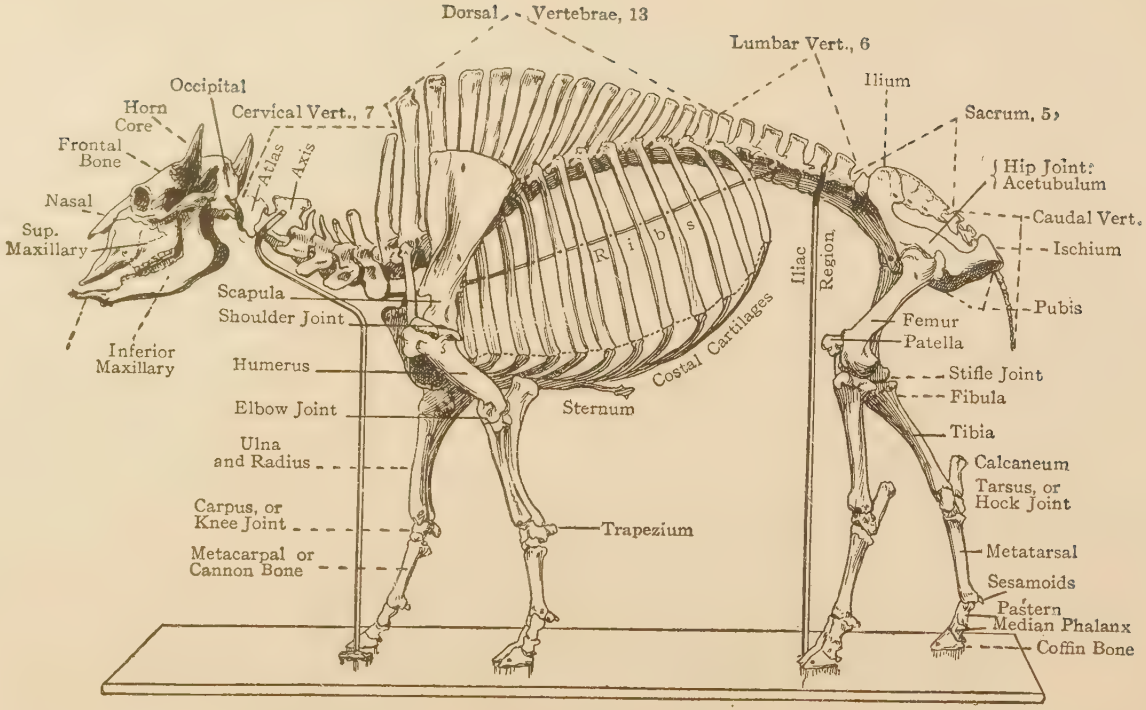
The American Buffalo

THE AMERICAN BISON, or BUFFALO.[1] —Because of its great size, imposing appearance, former abundance and value to mankind, this is the most celebrated of all American hoofed animals. Its practical extermination in a wild state is now a source of universal regret. In 1902 Congress took the first step toward its preservation from complete extinction, by appropriating $15,000 for the purpose of purchasing and establishing under fence, in the Yellowstone Park, a herd of captive Buffaloes. This undertaking was very wisely and appropriately placed in charge of the Department of Agriculture.

At this date (1914) there are about 349 wild Buffaloes alive, of which about 300 inhabit a desolate and inhospitable region southwest of Great Slave Lake. In 1890, the Yellowstone Park herd contained about three hundred head; but through inadequate protection and killing done by unprincipled poachers in quest of heads to sell, to-day only forty-nine head remain. The weakness of the efforts to protect that herd was a national disgrace. Through lack of sufficient laws and patrol service the poachers were permitted to rob the American people of a wild herd which no expenditure of money ever can replace.

There were in captivity, in January, 1913, 2,907 pure-bred Buffaloes, and the number is steadily increasing. Of

[1] A true "Buffalo" is an animal with *no hump* on its shoulders; and is found only in Africa and Asia. Our animal, having a high hump, is really a *bison;* but inasmuch as it is known to ninety-five millions of Americans as the "Buffalo," it would be quite useless to attempt to bring about a universal change in its popular name. There is but one living species.



SKELETON OF AN ADULT MALE AMERICAN BISON.

these, the majority are in large fenced areas, and every zoological park and garden contains as many head as it can properly accommodate.

The Buffalo breeds readily in captivity, and is easily cared for. The majority of captive animals are reasonably

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AMERICAN BISON IN THE NEW YORK ZOOLOGICAL PARK.

tractable, but occasionally an individual becomes savage and dangerous, and requires either solitary confinement or shooting. The best place in which to exhibit a savage Buffalo is a museum. Full-grown males must be watched closely for signs of permanent ill temper, and a savage Buffalo should

be treated the same as a tiger. Frequently the first serious sign of danger in a Buffalo is the murder of a weaker member of the herd.

The largest herd in a fenced game preserve is that owned by the Canadian Government, near Wainwright, Alberta, which in 1913 contained 1,052 head. The largest herd on public exhibition is that of the New York Zoological Park, which in 1913 contained forty-two head of pure-breed animals representing all ages. From the increase of this herd, two national bison herds have been founded. In 1907 the Wichita National Bison Herd was started with fifteen head presented by the Zoological Society, and by the end of 1913 it had increased to forty-eight head. In 1913 the society presented to the American Bison Society fourteen head to form the nucleus of the new Wind Cave Park National Herd, in southwestern South Dakota.

The value of a full-grown Buffalo cow in New York is from $400 to $500, and an adult bull is worth about $100 less. Exceptionally fine mounted heads are worth from $300 to $500.

The Buffalo was first seen by white men in Anahuac, the Aztec capital of Mexico, in 1521, when Cortez and his men paid their first visit to the menagerie of King Montezuma. In its wild state it was first seen in southern Texas, in 1530, by a shipwrecked Spanish sailor. The Buffalo once roamed over fully one-third of the entire continent of North America, and its numbers far exceeded those of any other large mammal of recent times, with the possible exception of the caribou.

Not only did it inhabit the plains of the West, but also the hilly hard-wood forests of the Appalachian region, the

northern plains of Mexico, the "Great American Desert," the Rocky Mountain parks on the continental divide to an elevation of 11,000 feet and the bleak and barren plains of western Canada, up to the land of the musk-ox. From north to south it ranged 3,600 miles, and from east to west about 2,000 miles.

The centre of abundance of the Buffalo was the Great Plains lying between the Rocky Mountains and the Mississippi Valley. When the herds assembled there, they covered the earth seemingly as with one vast, brown buffalo-robe.

It is safe to say that no man ever saw in one day a greater panorama of animal life than that unrolled before Colonel R. I. Dodge, in May, 1871, when he drove for twenty-five miles along the Arkansas River, through an unbroken herd of Buffaloes. By my calculation he actually saw on that memorable day nearly half a million head. It was the great southern herd, on its annual spring migration northward, and it must have contained a total of about three and one-half million animals. At that date the northern herd contained about one and one-half millions. In those days mighty hosts of Buffaloes frequently stopped or derailed railway trains, and obstructed the progress of boats on the Missouri and Yellowstone Rivers.

In 1869 the general herd was divided, by the completion of the Union Pacific Railway, into a "northern herd" and "southern herd." The latter was savagely attacked by hide hunters in the autumn of 1871, and by 1875, with the exception of three very small bunches, it had been annihilated.

In 1880 the completion of the Northern Pacific Railway led

to a grand attack upon the northern herd. In October, 1883, the last thousand head were killed in southwestern Dakota by Sitting Bull and about a thousand Indians from the Standing Rock agency, leaving only the Yellowstone Park bunch of two hundred head, a band of forty in Custer County, Montana, and the Great Slave Lake herd of about five hundred head.

One of the largest Buffaloes ever measured by a naturalist is the old bull which was shot (by the author) on December 6, 1886, in Montana, and which now stands as the most prominent figure in the mounted group in the United States National Museum. A very good picture of him adorns the ten-dollar bill of our national currency. His dimensions in the flesh were as follows:

	FT.	IN.
Height at shoulders	5	8
Length of head and body, to root of tail	10	2
Depth of chest	3	10
Girth, behind fore legs	8	4
Circumference of muzzle, behind nostrils	2	2
Length of tail vertebrae	1	3
Length of hair on shoulders		6½
Length of hair on forehead	1	4
Length of chin beard		11½
Estimated weight	2,100 pounds	

The shoulder height of wild Buffaloes of various ages, and both sexes, as taken by me on the Montana Buffalo range, are as follows:

	FT.	IN.
Male calf, 4 months old	2	8
Male one year old	3	5
Male two years old	4	2
Male five years old (average size)	5	6
Female, three years old	4	5
Female, eight years old	4	10

The Buffalo begins to shed its faded and weather-beaten winter coat of hair in March, and during April, May and June it presents a forlorn appearance. The old hair hangs to the body like fluttering rags, and at last, when it finally disappears, the body is almost bare. At this time the flies are very troublesome. By October the new coat is of good length and color, and in November and December it is at its finest. The animal is then warmly clad for the worst storms of winter, and the shaggy head is so well protected that the animal faces all storms instead of drifting before them. A bull Buffalo in perfect pelage is an animal of really majestic presence, and is far more imposing in appearance than many animals of larger bulk but with less hair.

The calves are born in May and June, and at first are of a brick-red color. This coat is shed in October, except in the case of calves born late in the season.

The flesh of the Buffalo so closely resembles domestic beef of the same age and quality that it is impossible for any one to distinguish a difference.

Interesting as have been the experiments made by Mr. C. J. Jones and others in the cross-breeding of Buffaloes and domestic cattle, it is now quite time that all such experiments should cease. It has been proven conclusively that it is impossible to introduce and maintain a tangible strain of Buffalo blood into the mass of western range cattle. This is admitted with great regret, but, inasmuch as it is absolutely true, the existing herds of Buffalo should not be further vitiated and degraded by the presence in them of animals of impure blood.

The presence of domestic blood in an adult animal is

readily perceived in the lower hump, longer tail, shorter pelage on the head, neck, shoulders and fore legs, and the longer and more slender horns. In the calf under one year of age, it is not always possible for even the best judges to detect a strain of domestic blood. In the year 1900 a male

THE WICHITA NATIONAL BISON HERD, OKLAHOMA.
Nucleus presented by the New York Zoological Society, 1907.

calf was inspected and passed by four men who were with good reason considered qualified judges of the points of Buffaloes; but two years later that animal stood forth unmistakably as a cross-breed, one-quarter domestic.

In judging Buffaloes, the finest animals are those with the greatest height of hump, heaviest and longest pelage on the neck and shoulders, shortest tails and horns curving with the shortest radius.

I regard the American Buffalo species as now reasonably secure against extermination. This is due to the fact that it

breeds persistently and successfully in captivity, and to the great efforts that have been put forth by the United States Government, the Canadian Government, the American Bison Society, the New York Zoological Society and several private individuals.

The species reached its lowest ebb in 1889, when there were only 256 head in captivity and 835 running wild. The increase has been as follows:

1888—W. T. Hornaday's census	1,300
1889—W. T. Hornaday's census	1,091
1902—S. P. Langley's census	1,394
1905—Frank Baker's census	1,697
1908—W. T. Hornaday's census	2,047
1910—W. P. Wharton's census (in North America)	2,108
1912—W. P. Wharton's census (in North America)	2,907

To-day (January 1, 1914) nearly one-half of the living Buffalo are in very large, perpetually established governmental parks, and are breeding rapidly, as follows:

IN THE UNITED STATES

Yellowstone Park fenced herd, founded by Congress, 1905	125
Montana National Bison Range, founded by the American Bison Society, 1909	96
Wichita National Bison Range, founded by the New York Zoological Society, 1907	48
Wind Cave National Bison Range, South Dakota, founded by the American Bison Society, 1913	19
Niobrara (Neb.) National Bison Range, 1912	10

IN CANADA

Buffalo Park, Wainwright, Alberta	1,052
Elk Island Park, Alberta	53
Rocky Mountains Park, Banff, Alberta	27
Total in National and Provincial Preserves	1,430

Of wild Buffalo there are only three groups: 49 head in the Yellowstone National Park, about 75 Pablo "outlaws" around the Montana Bison Range and between 300 and 400 head in northern Athabasca, southwest of Fort Resolution, existing in small and widely scattered bands, and not perceptibly increasing.

The efforts of man to atone for the great Buffalo slaughter by preserving the species from extinction have been crowned with success. Two governments and two thousand individuals have shared this task,—solely for sentimental reasons. In these facts we find reason to hope and believe that other efforts now being made to save other species from annihilation will be equally successful.

The Musk-Ox

The Musk-Ox[1] is an inhabitant of the frozen North, the land of snow and ice, of howling storms and treeless desolation. In 1901 Commander Peary killed a specimen within half a mile of the most northerly point of land in the world, —the northeastern extremity of Greenland.

How this animal finds food of any kind during the dark and terrible arctic winter, is yet one of the secrets of Nature. After making all possible allowance for the grass, willow and saxifrage obtainable by pawing through the snow and on ridge-crests that are swept bare by the blizzards, it is still impossible to explain how the Musk-Ox herds find sufficient food in winter, not only to sustain life, but actually to be well fed.

[1] *O'vi-bos mos-cha'tus.*

WHITE-FRONTED MUSK-OX.

Adult pair in the New York Zoological Park. Female left. Male right.

I gaze upon each living Musk-Ox to be seen in captivity with a feeling of wonder, as if it were a creature from another world. There are times, also, when I wonder whether many of the visitors who see them quietly munching their clover hay appreciate the effort that has been put forth to capture them in the remote and desolate regions of the far North, keep them alive and bring them to civilization for public exhibition.

The Musk-Ox is one of the strangest of all our large animals, and its appearance is so odd and striking that when once seen by an observant person it is not easily forgotten. In it one sees an oblong mass of very long and wavy brown hair, $4\frac{1}{2}$ feet high by $6\frac{1}{2}$ feet long, supported upon very short and post-like legs that are half hidden by the sweeping pelage of the body. The three-inch tail is so very small and short it is quite invisible. There is a blunt and hairy muzzle, round and shining eyes, but the ears are almost invisible.

The whole top of the head is covered by a pair of horns enormously flattened at the base and meeting each other in the centre line of the forehead. From the meeting point they sweep downward over the edge of the cranium, close to the cheeks, but finally recurve upward before coming to a point, like the waxed mustache of a boulevardier.

The iris of the Musk-Ox is of a chocolate-brown color, the pupils are elongated and bluish purple. The lips and tip of the tongue are also bluish purple.

The outer hair is a foot or more in length, and often touches the snow when the animal walks. In the middle of the back is a broad "saddle-mark," of shorter, dull-gray hair. Next

to the body is a woolly coat of very fine, soft, light-brown hair, very clean, and so dense that neither cold nor moisture can penetrate it. This is for warmth. The longer and coarser hair that grows through it is the storm-coat, to shed rain and snow. Our first Musk-Ox began to shed its woolly undercoat on April 10. On April 26 it was loose all over the body, and beginning to hang in rags; therefore, for both the comfort and the appearance of the animal, we threw her upon the ground, held her securely, and combed it all out. It was very fine, curly, free from oil, and the entire mass weighed six pounds.

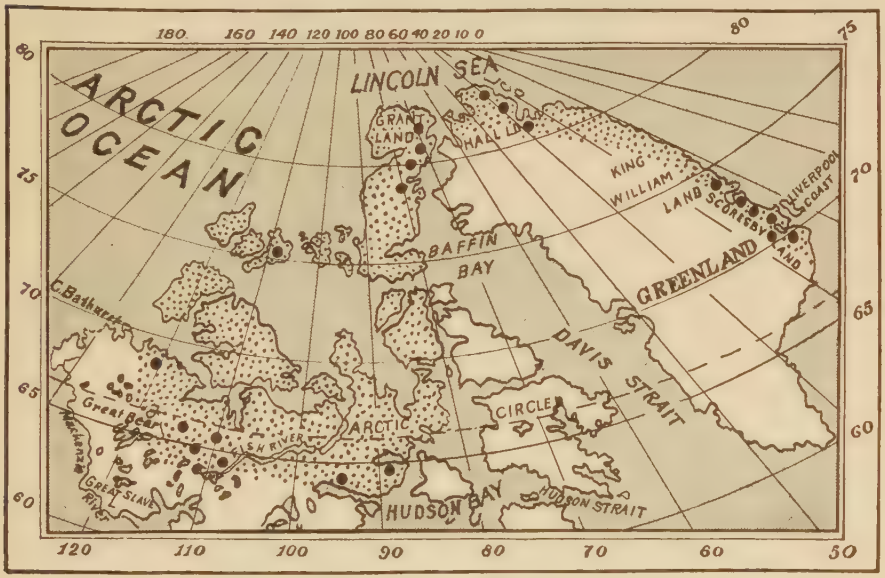
Although known for more than a century, the Musk-Ox is one of the last of the large land mammals of the world to come into captivity for public exhibition, and it was not until 1900 that its soft anatomy was studied for the first time.

Anatomically, this animal presents a few sheep-like features. By some writers their importance has been so much exaggerated that the name "Musk-Sheep" has been proposed as a substitute for Musk-Ox. But the sheep-like characters are insignificant in comparison with those that are clearly ox-like.[1]

Two species have been described. That of the Barren Grounds of the mainland of North America has long been known as *Ovibos moschatus*. In 1901 the animal of Greenland and northern Grinnell Land was described as *Ovibos wardi*, the White-Fronted Musk-Ox, because of a band of gray or dirty-white hair, extending across the top of its head.

[1] See E. Lonnberg, on "The Anatomy of the Musk-Ox," in the Proceedings of the Zoological Society of London, 1900.

Although this animal is called a Musk-Ox, it has neither the odor nor the taste of musk, and its flesh is excellent food. General Greely, Commander Peary and many other explorers have feasted on its flesh. In their native desolation these animals go in herds of from twenty to fifty head, are easily



RANGE OF THE MUSK-OX.

Heavy black spots signify actual occurrences. The dotted area indicates the probable range of the genus. The species north of Great Slave Lake is *Ovibos moschatus*, and that of Greenland and Grant Land is the White-Fronted Musk-Ox, *Ovibos wardi*.

brought to bay by dogs, and under such circumstances they stupidly stand facing their enemies until killed. This habit, so fatal in the presence of man, is all that saves the herds from being exterminated by the hordes of big white wolves which infest the Barren Grounds.

General A. W. Greely states that the average weight of ten Musk-Oxen, dressed, was 360 pounds, while the heaviest

weighed 432 pounds. This would indicate an average live weight of 404 pounds, and a maximum live weight of 604 pounds.

The accompanying map shows the range of the Musk-Ox, the southern limit of which is 64°. During the last twenty years whole herds have been killed in the Barren Grounds north of Great Slave and Great Bear Lakes, at Lady Franklin Bay, and on the eastern and northeastern coasts of Greenland and Grant Land.

During the year 1899 a Swedish scientific expedition to the east coast of Greenland, under the leadership of Professor A. G. Nathorst, of the Natural History Museum of Stockholm, made important and valuable contributions to the life history of *Ovibos wardi*. On the barren, rocky hillsides and level upland pastures surrounding Scoresby Sound and Liverpool Bay, from Latitude 70° to about Latitude 74°, the expedition found Musk-Ox in herds of from three to sixty-seven individuals, until the total number observed amounted to between two hundred and thirty and two hundred and forty. For the first time this remarkable species was photographed in its wild haunts, by Professor Nathorst, Mr. Johannes Madsen and Mr. E. Nilson, and with very gratifying success. Of these pictures the most perfect is that which shows the leader of the expedition closely approaching a herd.

Professor Nathorst states that to the leeward of a herd, the odor of the animals was noticeable at a distance of 100 metres, but that when a freshly slain animal is promptly and properly eviscerated, the flesh is free from musky flavors, and very good.

Reproduced by permission of A. G. Nathorst.

WILD MUSK-OX HERD AT FRANZ JOSEPH FIORD, E. GREENLAND, 1899.

The figure in the foreground is that of Prof. Nathorst. Photographed by. E. Nilson, Lat. 73° 30′.

One of the most important discoveries of the expedition was the fact that the region visited had once been inhabited by Eskimo, but their kitchen-middens contained no remains of Musk-Ox, from which, and from other evidence, Professor Nathorst concludes that the presence of that animal on the eastern coast of Greenland is due to a southward migration along the coast which has taken place since 1823.[1]

In 1899 a Swedish expedition carried to Europe two male specimens captured on Clavering Island, on the east coast of Greenland. Both were purchased by the Duke of Bedford.

In 1900 thirteen living specimens were captured on the eastern coast of Greenland, between Latitude 70° and 74°, and taken alive to Europe.

One male in Woburn Park, England, owned by the Duke of Bedford, survived until 1903.

In March, 1902, the New York Zoological Park received, as a gift from Mr. William C. Whitney, a female Musk-Ox twenty-one months old, captured on the Barren Grounds north of Great Bear Lake, about Latitude 69°. This specimen died of acute pneumonia on August 16, 1902.

In September, 1902, a very small female Musk-Ox calf, captured by Commander Robert E. Peary, at Fort Conger (Latitude 81°), was received in the New York Zoological Park, as a gift from the Peary Arctic Club. It died in October.

In 1903 (July) five Musk-Ox calves, one male and four females, arrived at Tromsoe, Norway, from Greenland, and were offered for sale to zoological gardens generally.

[1] See "Le Loup polaire et le Boeuf Musque," par A. G. Nathorst, Bulletin de la Société Géographie, Paris, 1901.

The first specimen exhibited in the New York Zoological Park, in 1902, was captured in March, 1901, thirty miles from the Arctic Ocean, directly north of Great Bear Lake, by a party of Eskimo hunters and whalers sent by Captain H. H. Bodfish, from the steam whaler *Beluga*. When two years old it stood 3 feet 2 inches high at the shoulders, and was 4 feet 10 inches in length. Its food was clover hay, raw carrots or potatoes, a little green grass when in season, and occasionally a few apples.

In 1909 we received a female Musk-Ox calf that was caught in the summer of that year on Melville Island, which is well-nigh the most northwesterly land of the great arctic archipelago. This animal matured very successfully in the Zoological Park, and in 1914 was still living and in excellent health.

In 1910 the Zoological Park received a herd of five Musk-Ox calves which were caught in Ellesmere Land by Paul J. Rainey and Harry C. Whitney, and which were presented to the New York Zoological Society by Mr. Rainey. All these animals matured well, and lived in excellent condition until the summer of 1913, when two of them died from the effects of a period of unusually hot and sultry weather. The remaining three survived, and in 1914 were still in excellent health.

On January 1, 1914, there were three Musk-Ox living in European zoological gardens.

The Mountain Sheep

High on the mountain's frowning crest,
Where lines of rugged cliff stand forth,
Where Nature bravely bares her breast
To snowy whirlwinds from the north;
High in the clouds and mountain storms,
Where first the autumn snows appear,
Where last the breath of springtime warms,
—There dwells my gallant mountaineer.

And truly he is a gallant mountaineer. Wherever found, the Mountain Sheep is a fine, sturdy animal, keen-eyed, bold, active and strong. It fears no storm, and defies all enemies save man and domestic sheep. From the former it receives bullets, from the latter, disease. Whether its home is the highest crags of the saw-tooth ranges, the boldest rim-rock of the mountain plateaus or the most rugged "bad lands," it is always found amid the scenery that is grandest and most inspiring.

In summer its favorite pastures are the treeless slopes above timber-line, where, on our northern mountains, grasses and wild flowers grow in astonishing profusion. When the raging storms and deep snows of winter drive the elk and deer down into the valleys for shelter and food, the Mountain Sheep makes no perceptible change in altitude.

All the year round this animal is well fed, and its savory flesh invites constant pursuit by the mountain lion, and by hunters both white and red. The massive, curving horns and handsome head of the adult ram, taken amid grand mountain scenery, with much difficulty and no little danger, constitute, in my judgment, one of the finest trophies that a true

sportsman can win. But it must be clean, and not haunted by the ghosts of slaughtered ewes and lambs! One of the greatest days of my life was that on which I pursued and killed, alone, amid the grandeur of the Shoshone Mountains, my first big mountain ram. It was then that I learned how much a Mountain Sheep needs to be seen in its native cloud-land in order to be fully appreciated. It is an animal for which my admiration is as boundless as are the glories of its mountain home.

The Mountain Sheep is a bold and even reckless climber. It is robust and strong on its legs, yet active withal, and capable of feats of endurance that are really astonishing. It cannot, and never did, "leap from a height, and alight upon its horns,"—save by some neck-breaking accident. When pursued it can, however, dash down appalling declivities, touching here and there, and land in safety, when to the observer it seems certain to be dashed to death.

The young are born in May or June, above timber-line if possible, among the most dangerous and inaccessible crags and precipices that the mother can find. Her idea is to have her offspring begin its life in places so steep and dangerous that a very slight effort on its part will suffice to keep it beyond the reach of foes. The lamb's most dangerous enemy is the eagle, against which the mother cannot always successfully guard it.

Except the burrhel and aoudad, any adult Mountain Sheep, from either the Old World or the New, can readily be recognized by its massive, round-curving horns, which, when seen in profile, describe from one-half to three-fourths of a circle, or more.

No wild animals other than wild sheep have circling horns. The largest species of wild sheep are found in Asia, and are known respectively as the argali and Marco Polo's sheep. The horns

DISTRIBUTION OF MOUNTAIN SHEEP IN NORTH AMERICA IN 1914.

The black dots represent, approximately, actual observations.

1. Big-Horn Sheep (*Ovis canadensis*).
2. Nelson's Big-Horn (*O. canadensis nelsoni*) and Sierra Big-Horn (*O. canadensis sierrae*).
3. Lower California Big-Horn (*O. canadensis cremnobates*).
4. Mexican Big-Horn (*Ovis mexicanus*).
5. Black Mountain Sheep (*O. stonei*).
6. Fannin's Mountain Sheep (*O. dalli fannini*).
7. White Mountain Sheep (*O. dalli*).
8. Kenai White Sheep (*O. dalli kenaiensis*).

of the argali are the greatest in size and weight, and those of Marco Polo's sheep have the widest spread.

Seven species of mountain sheep are found in North America, of which five have been described since 1883. They are scattered from the northern states of Mexico through the

Rocky Mountains almost to the shore of the Arctic Ocean, and throughout one-half of Alaska, a range fully 3,600 miles long. The accompanying map shows actual occurrences of the various species during the past twenty years.

Of our seven species, four are so interesting they deserve separate notice.

The Big-Horn, or Rocky Mountain Sheep,[1] has been known for one hundred and ten years, and it is the species which is most widely known in America. Once quite abundant throughout the Rocky Mountains from Mexico to Latitude 57° in northern British Columbia, it has been so persistently hunted and slain that now it exists only in small bands, in widely separated localities. In all of our western states save Wyoming, Montana, Idaho and Washington, the killing of Mountain Sheep is now prohibited for a term of years, and it is hoped that these laws will be enforced and respected. Wherever they are ignored, the wild sheep are doomed to extinction, for the reason that the fancied legal protection of female sheep is disregarded, and wherever rams are killable by law the ewes disappear fully as fast as the rams. Of course this spells extermination.

The general color of the Big-Horn is gray-brown, with a large white or cream-yellow patch on the hind quarters, completely surrounding the tail. A large ram killed by the author in the Shoshone Mountains, Wyoming, on November 16, 1889, stood 40 inches high at the shoulders, was 58 inches in length from end of nose to root of tail; its tail was 3 inches long, and its weight was about 325 pounds. Although the

[1] *O'vis can-a-den'sis.*

From a painting by Carl Rungius.

THE MASTER OF THE TRAIL.

A Mountain Lion lying in wait on a narrow sheep-trail, high up on a mountainside, is dismayed by the great size and threatening aspect of the leader of the band of Big-Horn.

snow on their wild pasture was knee deep, and the sheep were pawing through it to reach the tallest blades of dry grass, they were as well fed and fat as if they had been feeding at a manger.

Copyright, 1902, by Harry Pidgeon.

HEAD OF WHITE MOUNTAIN SHEEP.

Shot and photographed on the Kenai Peninsula, Alaska, by Harry Pidgeon.

The largest horns of this species measure 18 inches in circumference at the base; but any horns which are 15 inches in basal circumference may be considered large. All female wild sheep have horns, but they are small, short, erect and much flattened. They vary in length from 5 to 8 inches.

THE PINACATE BIG-HORN (*Ovis canadensis*), of the Pinacate Mountains, in the northwestern corner of Sonora, Mexico, on the eastern shore of the Gulf of California, is of the same species as the Big-Horn of the Rocky Mountains, but it is of peculiar interest. It inhabits what is literally one of the jumping-off places of the

genus *Ovis* in its progress southward. At Pinacate and the Seri Mountains it is stopped by aridity, heat, thirst and the general scarcity of food. In 1907 we collected several specimens on the awful lava-fields of Pinacate, and we found that there the robust Big-Horn of the North had greatly diminished in size. The rams measured only 37 inches in shoulder height, which is from 3 to 4 inches below the normal height farther north. The legs were short, and delicately formed, the hoofs were small, the pelage was very short and thin and the weight of rams was about 30 per cent under the average figures for northern adult animals.

Southward of the range of the Big-Horn are found three new species which appear to be offshoots of it. In southern California is found the California or Nelson's Mountain Sheep,[1] a smaller animal than the big-horn, short-haired, and of a pale salmon-gray color. On the peninsula of Lower California there is to be found—if looked for during the next five years—a short-haired, large-horned species that has been described as *Ovis cremnobates*. Of this species some fine heads exist in New York and Philadelphia collections of big-game heads.

In the state of Chihuahua, Mexico, is found the Mexican Mountain Sheep,[2] in color much like the Californian species, but larger, and with large ears. The horns sometimes measure $16\frac{1}{2}$ inches in basal circumference. This species is now almost, if not quite, extinct.

The White Mountain Sheep, or Dall's Sheep,[3] of Alaska, discovered and described by E. W. Nelson in 1884,

[1] *O'vis nel'son-i.* [2] *O'vis mex-i-can'us.* [3] *O'vis dall'i.*

is an animal of very striking appearance. When its hair has not been stained by mud or dirt, it is everywhere pure white, and its horns have a yellowish, amber-like appearance. From May to September, during the shedding period, the hair is

WIDE-HORNED WHITE MOUNTAIN SHEEP
From Western Yukon Territory.

so short and so often stained by reddish earth that the skin is almost worthless as a trophy. From October to February, however, the pelage is very long and thick, and snow white. This species is noticeably smaller than the big-horn, and the horns are smaller and more slender in proportion. A large adult ram measures 39 inches high at the shoulder, and the ewe 33½ inches.

By reference to the map it will be seen that this species

is very widely distributed throughout Alaska and the Yukon Territory. Ten years ago it was abundant on the Kenai Peninsula and at the head of Cook Inlet, but many have been killed, and the number has been greatly reduced. Recently Congress has passed a law intended to protect not only the White Sheep but all the large game animals of Alaska; but it is fatally defective in the extent to which it permits big game to be slaughtered by natives and "prospectors."

In the White River country of southwestern Yukon Territory, not far from the Alaskan boundary, individuals of this species often develop long and widely spreading horns that differ decidedly from the usual close spiral of typical specimens. An example is shown herewith. It suggests abundant horn food and an effort on the part of Nature to develop a wide-horned breed.

The White Mountain Sheep of the Kenai Peninsula have been described as a subspecies, and are known as *Ovis dalli kenaicnsis*. Their horns are small, and in form exhibit the close spiral.

The Black Mountain Sheep,[1] of northern British Columbia, is distinguishable by the dark-brown color of its sides and upper parts generally, and by its white abdomen. It is of the same size as the white sheep, but the two species together form a striking contrast. The Black Sheep species develops its darkest colors in the mountains north and south of the Stickine River. Farther north this species and the white sheep have been found inhabiting the same locality, and therefore we have ventured to show both in one plate.

[1] *O'vis stone'i.*

Painted by Carl Rungius.

WHITE MOUNTAIN SHEEP AND BLACK MOUNTAIN SHEEP.

Fannin's Mountain Sheep[1] is a comparatively new subspecies, found first on the Klondike River, Yukon Territory, in 1900. It is about the size of the white sheep, and has a snow-white head, neck and tail-patch, and a bluish-gray body, like a white sheep covered with a gray blanket. It also has a blue-gray tail, and a band of brown running down the front of each leg. The type specimen was sent from Dawson City to the Provincial Museum at Victoria, B. C., in 1900, and since then many others have been taken. This form is a connecting link between the white sheep and the black sheep, and inasmuch as specimens vary in color both ways into the White and Black species, it would seem that Nature has not yet completed her work of segregating Fannin's Sheep as a clearly defined species.

In the table printed on page 38 are given measurements in inches of some of the largest and finest wild-sheep horns with which I am personally acquainted.

Origin of American Mountain Sheep.—It seems highly probable that a number of species of North American mammals and birds were acquired by immigration from the Old World. Of this there is no stronger evidence than that furnished by the genus *Ovis*, which was cradled in the mountains of Central Asia. Western Mongolia and Tibet have produced the colossal Argali, the wonderful, wide-horned Polo Sheep, and the robust Siar Sheep.

As the genus spread southward, it produced the small Urial and Burrhel, and stopped short at the northern edge of the superheated plains of India. But northward its fate

[1] *O. dall'i fan'nin-i.*

was very different. From the place of its nativity—let us say the Altai Mountains—there stretches northeastward through Siberia and Kamchatka, Alaska, and thence down to British Columbia and northern Mexico a practically unbroken chain of mountain sheep 7,500 miles long. From northern India to northern Mexico the species stand in the following order: Burrhel and Urial, Argali and Polo's Sheep, Siar Sheep, Kamchatkan Sheep, White Sheep, Black Sheep, Big-Horn and Mexican Sheep.

Measurements in Inches of Extra Large Mountain Sheep Horns in American Collections

		LOCALITY	BASAL CIRCUMFERENCE	LENGTH ON OUTER CURVE	SPREAD
Siberian Argali	*Ovis ammon*	Central Asia	19½	59⅛	40
Marco Polo's Sheep	*Ovis poli*	Central Asia	15¾	60¾	50
Siar Sheep	*Ovis siarensis*	Central Asia	15½	47¼	30½
Karelin Sheep	*Ovis karelini*	Chinese Turkestan	13½	44½	36
Pinacate Sheep	*Ovis canadensis*	Pinacate Mts., N. W. Mexico	17	29½	19¼
Lower California Sheep	*Ovis cremnobates*	Lower California	16¼	42½	25¾
Big-Horn	*Ovis canadensis*	S. W. Alberta	17¾	40	25
Mexican Sheep	*Ovis mexicanus*	Chihuahua, Mexico	16½	35	18¼
Black Sheep	*Ovis stonei*	British Columbia	14	44	25
White Sheep	*Ovis dalli*	N. W. Yukon Terr	14¾	44¾	34½
Kenai White Sheep	*Ovis dalli kenaiensis*	Kenai Peninsula, Alaska	13	38⅜	20⅛

It requires no stretch of the imagination to behold Bering Strait choked with the great polar ice-pack, and hardy, strong-limbed bears, wolves, mountain sheep and reindeer crossing over the sixty miles that now separate Asia from Alaska, and spreading in all directions over North America.

HORNS OF ASIATIC AND AMERICAN MOUNTAIN SHEEP.

1. Siberian Argali. No. 1 in list on page 38.
2. Marco Polo's Sheep. A specimen of medium length only.
3. Big-Horn. A very large pair.
4. White Sheep.

I fully believe that the parent stock of our mountain sheep, caribou, moose, wolves and bears came from Asia by this route.

The Rocky Mountain Goat, or White Goat,[1] is the only American representative of the numerous species of wild goats, ibexes and other goat-like animals so numerous throughout the Old World from Japan to India, southern Europe and northern Africa. Thus far without one exception all the rumors of "ibex" that have come from Wyoming, Colorado, Montana and British Columbia have proven entirely without foundation. In one case a Colorado hunter discovered a small band of once-tame goats running wild and reported it to *Recreation* magazine, with a photograph of a mounted specimen. It is reasonably certain that no representative of the genus *Capra* inhabits North America or ever has done so during historic times, and all stories of "ibexes" in America may be put down as chargeable to young mountain sheep rams or ewes with extra-large horns.

The only use or value thus far found in the Mountain Goat is as "game" for sportsmen who like difficult and dangerous tasks. With but few exceptions, it inhabits the grassy belt of the high mountains just above timber-line, and it particularly loves the dangerous ice-covered slopes and "hog-backs" over which only the boldest hunters dare follow it. This, however, specially applies to its haunts in the Rocky Mountains and the Coast Range. On the coast of British Columbia, the White Goat sometimes descends so near to tide-water that more than one specimen has been shot from a canoe.

[1] *O-re-am'nos mon-tan'us.*

Since recording in the first edition of this work the then prevailing opinion that the Mountain Goat is "a stupid animal," I have had an opportunity to study this species in its haunts, under most favorable conditions. My observations do not confirm the "stupid" theory; quite the contrary.

As might be expected of an animal that is born and reared amid appalling dangers of many kinds, the Mountain Goat is a creature of philosophic mind, and is much given to original reasoning. He has chosen the rugged crags at and above timber-line as the haunts best calculated to enable him to escape from his wild-animal enemies—the bears, pumas and wolves, and from his arch-enemy, man. When danger threatens, he climbs up, or down, to the sheltering arms of the steepest precipice he can find, where no creature without wings dares to follow him. His cue is to find a line of retreat inaccessible to his pursuer, and to disappear as quickly as possible. But he must look ahead and plan out his line of retreat, or come to grief.

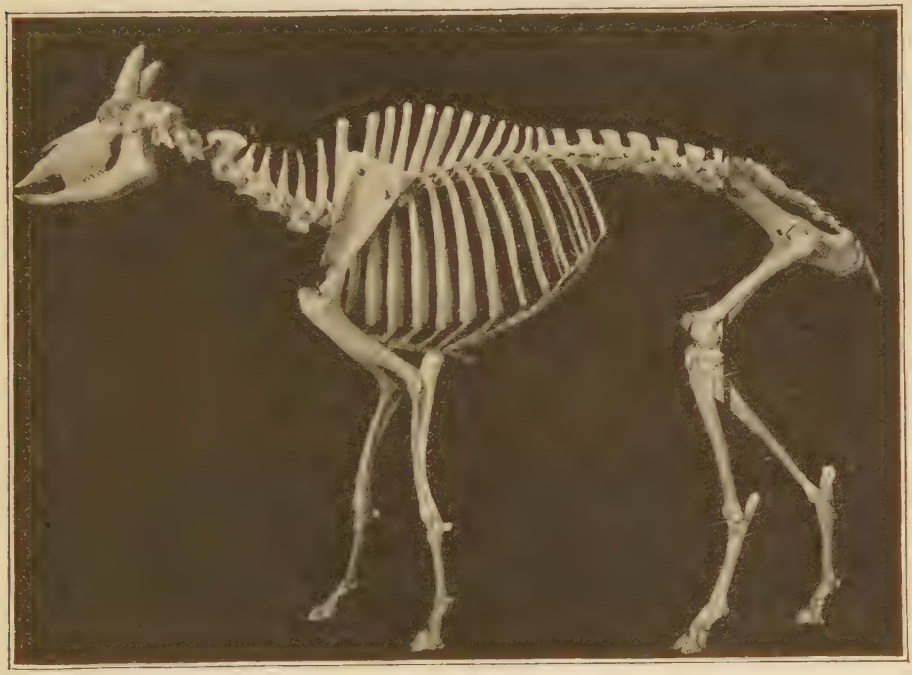
A deer, or a mountain sheep, displays the dash and *élan* of a cavalryman, putting forth great speed in the first mile; but the Goat figures things out on scientific principles, like a general of artillery. If the Goat were not a good observer, a good reasoner and at all times courageous and level-headed, he would quickly come to grief. He would be caught in avalanches, drowned by freshets, carried down by snow-combs, blown off precipices or caught by grizzly bears. But none of those unpleasant things happen to him, save as most rare occurrences.

Excepting the musk-ox, the Mountain Goat is the only

Painted by Carl Rungius.

ROCKY MOUNTAIN GOAT.

North American hoofed animal which does not become utterly panic-stricken when brought to bay by dogs. An elk, deer, sheep or caribou cornered on a narrow ledge will quickly leap off to instant death; but the marvellously cool



SKELETON OF AN ADULT MALE MOUNTAIN GOAT.
By courtesy of the Field Columbian Museum, Chicago. F. J. V. Skiff, Director.

Mountain Goat stands fast and waits for something favorable to develop. If he can charge the dogs that annoy him, stab them to death and toss them off into space, he will gladly do so; but if he cannot, he sticks to his ledge, grits his teeth, occasionally stamps with vexation and says: "Well, what are you going to do about it?"

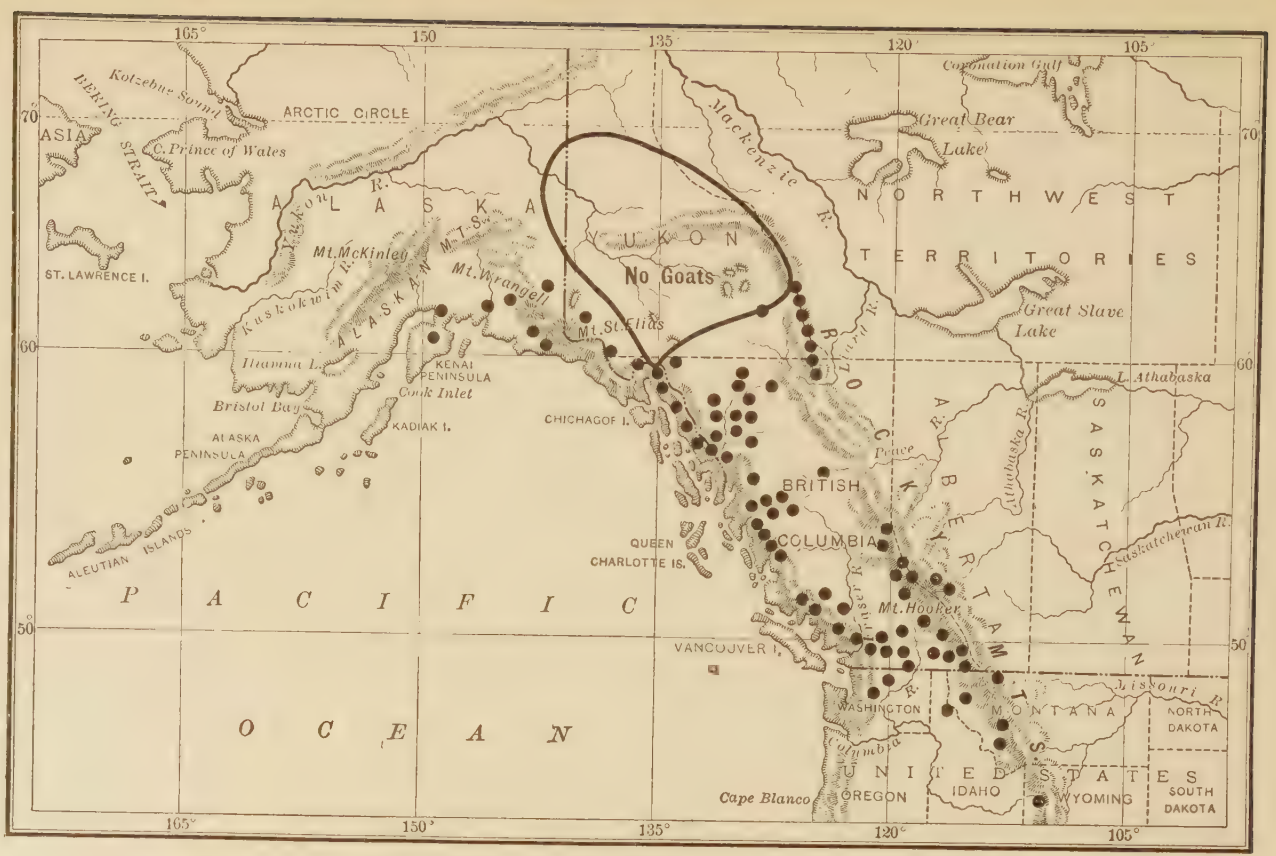
The Mountain Goat mother stays with her helpless kid

and defends it, even when attacked by dogs, regardless of her own safety.

The White Goat is quite as odd in appearance as in mind and habit. Judging merely from its appearance an observer would be justified in considering it a slow, clumsy creature, safe only upon level ground. On the contrary, it is the most expert and daring rock-climber of all American hoofed animals. Its hoofs are small, angular and very compact, and consist of an ingenious combination of rubber-pad inside and knife-edge outside, to hold the owner equally well on snow, ice or bare rock. Mentally this animal has the steadiest nerves, the most indomitable courage and the greatest coolness in the face of danger that I am aware of in any hoofed and horned animal.

We have seen Goats cross walls of rock which neither man, dog nor mountain sheep would dare attempt to pass. We have seen a goat cross the face of a precipice of apparently smooth rock, to all appearances entirely devoid of ledges or shelves of any kind, and so nearly perpendicular that it seemed an impossibility for any creature with hoofs to maintain a footing upon it. And yet, the goat not only passed safely across, but did it with perfect composure, frequently looking back, and turning around whenever he saw fit to do so.

In general outline this animal has the form of a pygmy American bison, and were its pelage dark brown instead of pure white, the external resemblance would indeed be striking. It has high shoulders, low hind quarters, stocky legs, a thick-set body and shaggy pelage. Its head is carried low,



DISTRIBUTION OF THE WHITE MOUNTAIN GOAT.

The black dots represent actual occurrences.

the crown seldom rising above the upper line of the shoulders and back, and the face is too long for beauty. The horns are so small, short and severely plain that they are neither beautiful nor imposing.

The weight of this animal is about that of the Virginia deer. The shoulder height of a good average-size male is 39 inches, length of head and body 61 inches, tail 4 inches, girth 53 inches and weight 276 pounds. The females average about one-fourth smaller. Except in length and color of pelage the Mountain Goat is clad after the style of the musk-ox. Next to the skin it wears a dense coat of fine wool, through and far beyond which grows a long, outside thatch of coarse hair. When free from dirt both these coats are clear white and contain no patches of color. Behind each horn is a peculiar bare patch of black, oily skin, the size of a half-dollar. The horns are small, smooth, very sharp-pointed and jet black; and the longest on record measure $11\frac{1}{2}$ inches. The cannon bone is proportionately the shortest to be found in any large ungulate.

This animal is not likely to be exterminated very soon, chiefly because of its inaccessibility, its lack of beauty as a trophy, and the expenditure of time, money and muscle that is necessary to get within gunshot of it. Its flesh is so musky and dry that it is not palatable to white men save when they are exceedingly hungry, and its skin has no commercial value. Nevertheless, in the United States the White Goat has been so much sought by sportsmen and others who like difficult hunting that now it is found only in Washington, Idaho and northwestern Montana. Northward of our boundary it is

scattered thinly and at long intervals throughout British Columbia and Alaska as far as the head of Cook Inlet, as shown on the accompanying map.

Up to the year 1903, only four white goats had ever been exhibited alive in the United States east of the Rocky Mountains. In 1905 five living specimens were procured at Fort Steele, B. C., and taken to the New York Zoological Park, where they throve remarkably well. They bred and reared their young (for the first time in captivity); and ever since 1905 a herd of these odd animals has been maintained in the park mentioned.

PRONG-HORNED ANTELOPE FAMILY

Antilocapridae

This unique Family, of one species and one subspecies, must not be confused or in any way connected with the large and important group of African antelopes, which contains a grand array of animals of all sizes, many of them odd and many of them noted for their beauty. The student who has a special liking for the large hoofed animals surely will find pleasure in making the acquaintance of such superb creatures as the sable antelope, the koodoo, the water-buck, the eland, the oryx, the gnu, the pallah and the hartebeest of Africa. We have reason to envy Africa her exclusive possession of all those fine creatures, not to mention her other hoofed animals, great and small.

The Prong-Horned Antelope[1] is found only in North America, and it possesses so many anatomical peculiarities,

[1] *An-ti-lo-cap'ra americana.*

found in no other animal, that zoologists have created for it a separate Family, which it occupies in solitary state. It is like an island in a vast sea, unrelated. Let him who hereafter may be tempted, either lawfully or unlawfully, to raise a death-dealing rifle against one of these beautiful prairie rovers, remember two things before he pulls the trigger: In this land of plenty, no man really needs this creature's paltry pounds of flesh; and if his two-cent bullet flies true to the mark, it will destroy an animal more wonderful than the rarest orchid that ever bloomed.

Remember the ages which Nature has spent in fashioning this wonderful combination of keen eye, fleet foot and graceful limb, and in preserving it from the extermination which overtook the great reptiles, rhinoceroses and toothed birds of the vast inland sea now known as the Uintah Basin. Surely this animal is worth perpetual protection at our hands, rather than needless, cruel and inexcusable slaughter. *It cannot be perpetuated by breeding in captivity; and unless preserved in a wild state, it will become extinct.*

Behold the list of characters in which this animal differs from all other antelopes: Although its horns grow over a bony core, they are *shed and renewed every year;* the horn bears a prong, and is placed directly over the eye; the feet have no "dew-claws"; the hair consists of a hollow tube filled with pith,—coarse, harsh, straw-like and easily broken; and all the hair on the rump is fully erectile, like the bristles of swine. When fighting, or alarmed, this white hair is instantly thrown up, and on a fleeing animal it forms a dangerously conspicuous and inviting mark. To my mind, the white

rump-patch of the Prong-Horn is one of Nature's errors. It enables a pursuer to mark the animal long after it should really become invisible.

The Prong-Horned Antelope is next in size to the smaller species of our mountain sheep. It is smaller than the white-

Painted by Carl Rungius.

PRONG-HORNED ANTELOPE.

tailed deer of the north, but as large as the southern forms. The largest specimen shown in the Zoological Park herd measured 37½ inches high at the shoulders, had a head and body length of 47¾ inches, tail 3½ inches, and chest circumference of 35 inches. Its horns were 12⅛ inches long and 12½ inches wide between the tips. The longest horns on record are 20½ inches in length, but any that measure 12

inches may fairly be considered large. The female has no horns.

The colors of this animal are usually two, consisting of a cloak of light yellowish-brown thrown over the back and neck of an otherwise white animal. On the throat the brown is laid on in a curious collar-like pattern, and the adult males usually have a wash of black on their cheeks. The ears are very shapely, and from the neck an erect mane rises from 4 to 5 inches in length. The legs are exceedingly trim and delicately formed, and the erect horns and high pose of the head give the animal a very jaunty appearance.

In running it has three very distinct gaits. When fleeing from danger, it carries its head low, like a running sheep, and gallops by long leaps; when showing off, it holds its head as high as possible, and trots forward with stiff legs and long strides, like German soldiers doing the goose-step. Occasionally, it gallops with high head, by stiff-legged leaps, like the mule deer.

In captivity the Prong-Horn is always affectionate, trustful and very fond of being noticed; but the bucks soon became too playful with their sharp horns, and push their human friends about until the play becomes more dangerous than amusing. They readily come at call, and at times become very playful with each other. They cannot live on the rich, green grasses of the country east of the Great Plains, and are very difficult to keep in captivity. At the New York Zoological Park it has been found that they survive and breed only when kept in a paved corral, and fed on rolled oats, clover hay and a very limited amount of fresh grass. Those

who have attempted to preserve and breed the Prong-Horn in captivity have met with many discouragements, and failure has been the result of many experiments that deserved success.

ISOLATED HERDS OF PRONG-HORNED ANTELOPE
Existing in 1914, but steadily diminishing.

Even wild specimens only a few months in captivity are frequently subject to the attacks of an incurable disease called actinomycosis, or "lumpy-jaw," which I fear may greatly hasten the extinction of the species on its present ranges.

Owing to the extreme difficulty of maintaining this species

in captivity, its total extinction at an early date seems absolutely certain, unless it is fully and permanently protected in immense fenced game preserves, such as the Wichita and Montana National Bison Ranges, of 14 and 29 square miles respectively. Attempts are being made with Antelope in both those ranges.

In the United States this species exists only in small, isolated bands, in a few localities in Montana, Wyoming, Colorado, Texas, New Mexico, Nevada, Idaho, Utah, Oregon and California. In all these states save one its destruction has been absolutely prohibited for periods ranging from five to ten years, and it is hoped and believed that all will very shortly provide for its absolute protection. But has protection come to this species early enough to save it? It is very doubtful. Says Mr. A. G. Wallihan, in *Outdoor Life*, "Look at the Antelope! But I don't know whether you can find any to look at; for I don't think there are fifty in Routt County [Colorado], where ten years ago there were probably 50,000. They have almost completely disappeared here. No doubt a small herd of a thousand or so went north into Wyoming, but they will fare no better there."

The destruction of this beautiful and interesting creature is now absolutely inexcusable, and for the good name of Americans generally it is to be hoped that wherever a wild Prong-Horned Antelope is now to be found, public sentiment will protect it more powerfully and more permanently than can any statute law.

THE DEER FAMILY

Cervidae

General Observations.—The Deer Family is well represented on all continents, and on all large islands, save Africa, Australia and New Zealand. There are about forty-five well-defined species and many subspecies. With but one or two exceptions the species found in the tropics and subtropics are scantily antlered, dull in color and covered with coarse, thin hair. There is but one tropical deer which is really beautiful, and that is the axis, or spotted deer, of India and Ceylon.

The following facts regarding the deer of the world are worth remembering:

The American Moose is the largest member of the Deer Family, living or extinct.

The American Elk, or Wapiti, is the largest and finest of all the round-horned deer.

The Axis Deer is the most beautiful in color of all deer.

The Moose has the heaviest and most massive antlers, with the widest spread.

Male deer of all species have solid antlers, of bone, usually branching into several tines.

All members of the Deer Family shed their antlers and renew them completely every year.

The young of nearly all round-horned deer are spotted at birth.

All adult male deer are dangerous in the mating season, when their antlers are new and perfect.

The female Caribou is the only female deer with antlers.

The best deer to keep in captivity in a park is the Fallow Deer, of Europe; and outside of its own home the worst is the Columbian Black-Tail.

Except as already stated, nearly every country in the world is provided with representatives of the Deer Family, according to conditions. Nature has fitted the caribou to live in the awful lands of desolation in the Far North, and the moose in the forests fringing the Arctic barrens. The elk is fashioned for the plains, the foot-hills and open-timbered mountains of western America and central Asia. The white-tailed deer skulks in safety through the thickest forests of temperate North America, and in India and the Far East the axis deer, the sambar and the tiny muntjac, with only one or two tines on each antler, have been formed to slip through the tangled jungles with ease and safety.

North America has the good fortune to be rich in Cervidae. It has six prominent types, and at this date (1914) a full count reveals twenty-four recognized species and subspecies, which form a group combining the grand, the beautiful and the picturesque, and of very decided value to man. In the exploration and settlement of the United States and in the exploration of Alaska and the Far North, the wild herds have played an important part.

The unvarying distinctive mark by which any American representative of the Deer Family can be recognized is the presence on the male of *solid horns of bone, called antlers, which are shed once a year*, close down to the skull, *and are fully renewed by rapidly growing out in a soft state called "the velvet."*

When fully grown the antlers have several branches; but the first pair, which are grown during the second year, are only two straight and slender spikes called "dag antlers." The grouping of animals with antlers brings together in the Deer Family not only the true deer, but also the moose and the caribou.

Shedding and Renewal of Antlers.—At this point it is necessary to emphasize certain facts regarding the antlers of deer, elk, moose and caribou.

Many persons find it difficult to believe that the antlers of all these creatures drop off close to the skull every year and are completely renewed in about four months; but such is the fact. It is Nature's special plan to absorb the surplus strength of the males, and to render them weak and inoffensive during the period in which the mothers are rearing their young, when both the does and their fawns would be defenceless against savage males with perfect antlers. It seems incredible—unless watched from week to week—that the enormous antlers of full-grown moose or elk can be dropped and completely renewed again in as short a period as four months; but it is true.

During the first year of life, male members of the Deer Family have no horns of any kind, and in order to protect fawns from hunters destitute of pride, several of our states have enacted laws forbidding the killing of deer save males that have horns at least four inches long. This is a very wise and just measure.

The antlers of North American deer are usually dropped in March, but occasionally in February. Sometimes a day

or two passes between the fall of the first antler and the loss of the second. The root, or *pedicle*, exposed is a rough disk of bone belonging to the frontal bone of the skull. No blood flows. Dropped antlers are sometimes gnawed by rodents until destroyed; but many are picked up by those who look for them. At the end of the first week the bony disk or seat of the antler is covered

"DO ELK SHED THEIR ANTLERS?"
An answer from the New York Zoological Park.
1. March 21. 2. April 8.

over by the dark-brown skin of the head. At the end of two weeks, a rounded bunch, like a big brown tomato, has risen on the pedicle of each antler. It is soft, full of blood and easily injured.

Gradually this elongates into the form of a thick, blunt-ended club, in color brown or pink, shiny and thinly covered

with minute hairs. When fairly started the antlers of a healthy and vigorous elk or caribou grow at the rate of one-third of an inch per day, or even more. They are soft, spongy, warm, full of blood, are easily injured and if cut will bleed freely. The material of which they are composed, internally, is the same as that which forms the hair. The drain upon the animal's vitality during this period is very severe, and it is not strange that the animal is then meek and spiritless.

"DO ELK SHED THEIR ANTLERS?"
An answer from the New York Zoological Park.
3. April 30. 4. May 15.

A large pair of elk antlers, dropped in the Zoological Park on March 21, had been renewed to their full length by June 21, but the tips were flat and club-like. The first sign of the hardening process was the shrinkage of

the blunt tips of the tines to sharp points. Gradually the diameter of the entire antler decreased in size, and at the same time the hair composing the velvet grew longer. The surface now assumed a gray appearance. On August 1 all the points were sharp, and the antlers were in perfect form, but the velvet was all on.

The Elk's Calendar in the New York Zoological Park

Jan. 1. Pelage has grown perceptibly paler.

Feb. 1. Pelage has lost its lustre, and begins to look weathered.

Mar. 21. Antlers of the largest male dropped, 9 hours apart.

Apr 8. Each budding antler looks like a big brown tomato.

Apr. 18. New antlers about 5 inches long, thick and stumpy.

Apr. 30. Each antler has developed three branches. Young Elk born, well spotted. Closely hidden in the rocks. Height, 26 inches; length, 35 inches; weight, 30½ pounds.

May 10. Shedding in full progress; the Elk look their worst.

June 1. Shedding about half finished.

June 18. Antlers now full length, but club-like, well haired. Tips flat. Large male has finished shedding.

July 20. Antlers are now sharp at the tips. Flies troublesome. Herd bathes in the pond frequently and long.

Aug. 1. Entire herd now free from winter pelage. Animals look well in short, red summer coat, but smaller! Velvet still on antlers. Spots on young are all gone, and white rump-patch is fully developed.

Aug. 15. Two big males began to rub velvet from antlers, against trees.

Aug. 22. Antlers of one bull almost clean, but velvet still hangs in tatters, like carpet rags. Tips pure white, base looks bloody.

Sept. 15. The summer coat has been completely shed.

Oct. 1. The herd is at its best. All antlers clean and perfect. Pelage long, full and rich in color. Mating season now on. Bulls aggressive and dangerous. Fawns active and playful. The "bugle" of the bull is a shrill shriek, like an English locomotive whistle, sliding down the scale into a terrific bawl.

Deer as Dangerous Animals.—The rapid multiplication of deer parks and small collections of captive animals renders it necessary to offer a few words of warning regarding deer of all species. During the season immediately following the perfect development of the new antlers,—say September, October and November,—male deer, elk, caribou and moose sometimes become as savage as whelp-robbed tigers. The neck swells far beyond its natural size, the eye-pits distend, and the buck goes stalking about with ears laid back and nostrils expanded, fairly spoiling for a fight. I have seen stags that were mild and gentle during eight or nine months of the year suddenly transformed into murderous demons, ready and anxious to stab to death any unarmed man who ventured near.

At first a buck walks slowly up to his victim, makes a wry face and with his sharp, new antlers makes believe to play

with him. Not wishing to be punctured, the intended victim lays hold of the antlers, and seeks to keep them out of his vitals. On finding himself opposed, the buck begins to drive forward like a battering-ram, and then the struggle is on.

Heaven help the man thus attacked, if no other help be near! He shuts his teeth, grips the murderous bone spears with all his strength, leans well forward, and with the strength and nimbleness of desperation, struggles to maintain his grasp and keep his feet. Each passing instant the rage of the buck and his joy of combat increase. If the man goes down, and help fails to come quickly, his chances of escaping the spears are few.

Once when unarmed and alone I saved myself from an infuriated buck (fortunately a small one) by suddenly releasing one antler, seizing a fore leg low down, and pulling it up so high that the animal was powerless to lunge forward as he had been doing. In this way I held him at bay, and at last worked him to a spot where I secured a stout cudgel, with which I belabored him so unmercifully that he was conquered for that day.

The strength and fury of a buck of insignificant size are often beyond belief. The loving "pet" of May readily becomes the dangerous, fury-filled murderer of October. With a large deer of any species, a man not fully armed has little chance. In the winter of 1902, at Helena, Montana, a man armed with a pitchfork entered an elk corral, to show a friend that the large male elk feared him. The elk furiously attacked him and killed him before he could be rescued.

AMERICAN ELK, OR WAPITI.
In the New York Zoological Park.

Men who have charge of deer herds must keep the bucks in a perpetual state of fear. Do not make a pet of any male member of the Deer Family after it is two years old. It is dangerous. In the autumn or winter never enter an enclosure containing deer, elk or caribou unless armed with a pitchfork, or a long pole of tough wood, with an iron spike in the end. If a buck threatens to attack you, strike him *across the nose;* for that is his tender spot. When angry he can take any amount of punishment on the forehead, neck and shoulders, without its diminishing his energy in the least.

Solitary bucks in small corrals are most dangerous. Where deer run in a large herd, the danger is much less; but if a herd-buck begins to approach people with the slow stride of a pugilist, lips and nose turned up, ears laid back, and snorting defiantly, shut him up at once, or saw off his antlers close to his head, before he does mischief.

Fighting Among Deer.—Even among themselves deer are murderous brutes. It is quite a common thing for one buck treacherously to assassinate another; and some are such thorough degenerates that they will murder their own does and fawns. The largest and handsomest bucks are not always the best fighters, for they often lack the activity and youthful vigor which give supremacy to a younger animal.

Judging by the number of pairs of deer that have been found dead with their antlers tightly locked, wild deer are much given to fighting during the rutting season. It is to be remembered, however, that male deer are in the habit of playfully sparring with their horns, and it is very likely that many a death-lock has been due to a pushing-match rather

than to deadly combat. The antlers of our white-tailed and mule deer are peculiarly adapted to the fatal interlocking that has caused many a fine buck to perish miserably by slow starvation. Pushing-matches among deer in captivity are quite common.

The Round-Horned Deer

The American Elk, or Wapiti,[1] is as tall as a horse, handsomely formed, luxuriantly maned, carries its head proudly, and is crowned by a pair of very imposing antlers. Even the doe Elk is a handsome and stately creature; and from the second week after its birth the fawn steps about with the air of a game cock. If you will observe a seven-year-old male Elk in October or November, when the modelling of his form is handsomest, his pelage long, bright and immaculate, his neck swollen with pride, and his fine new antlers ready for admiration or for battle, I think you will say, "This is the king of the *Cervidae!*"

Even the moose, giant though he be, is not a creature of regal presence, like the Elk. Although the latter is a large and heavy animal, it has the small and shapely legs and hoofs of a thoroughbred. It is strictly a creature for solid ground; and, while very fond of bathing in ponds during hot weather, it avoids swamps and low situations.

It is both a grazing and browsing animal. Although up to twenty-five years ago it often ranged far out into the western edge of the Great Plains, and loves to frequent mountain

[1] *Cer'vus can-a-den'sis.* In Europe this animal is called the Wapiti; and the European Moose is called the "Elk."

parks, it is also a forest animal. Originally its range coincided to a remarkable extent with that of the buffalo, covering fully three-fourths of the United States, from the Adirondacks and the eastern foot-hills of the Alleghanies to California and Van-

From a photograph. Copyrighted by S. N. Leek, 1913.

ELK HERD IN JACKSON HOLE, WYOMING.

couver Island. It was not found, however, on the Great Plains north of the Saskatchewan.

In summer it ascends the Rocky Mountains to the very crest of the Continental Divide, 11,000 feet above the sea. The species reaches its highest physical development on the backbone of the continent, between northwestern Wyoming and southern Colorado.

From nineteen-twentieths of its original range this grand animal has been exterminated. To-day it is abundant in

one locality only, the Yellowstone National Park and the country immediately surrounding it, where about 47,000 Elk find a safe retreat.

Every winter the Elk herds of the Yellowstone Park migrate southward to feed in the sheltered valleys of Jackson Hole. During these migrations, which usually are made through deep snow, Mr. S. N. Leek and others have made many fine photographs of the herds. One of Mr. Leek's striking pictures is reproduced herewith.

In 1912 the number of Elk living in North America was about 54,850, distributed as follows:

Yellowstone Park and its environs	47,000
Idaho (permanently)	600
Washington (Olympic Mts.)	1,200
Oregon	500
California	400
New York (Adirondacks)	400
Minnesota	50
Vancouver Island	2,000
British Columbia (S. E.)	200
Alberta	1,000
Saskatchewan	500
In various parks and zoological gardens	1,000

It is probable that within a few years the Elk will disappear from all localities wherein it is not rigidly protected. Some Americans who go hunting—I will not call them sportsmen—are so greedy, so lawless, and so wasteful of animal life, that we frequently hear accounts of Elk slaughter which are enough to disgust all decent men.

Fortunately Elk are easily bred in confinement, and during the last twenty years many good herds have been estab-

lished in the great private game preserves that are scattered from New Hampshire and Massachusetts to Minnesota. In addition to these, there are many smaller herds in small private parks. Nearly every city north of the Potomac has a herd of Elk in one of its parks, and other hardy native animals in an establishment known either as a "zoo," a zoological garden, or a zoological park. Thanks to this constantly increasing public demand for living collections of wild animals, the American Elk and buffalo are now familiar objects to the children of at least twenty American cities.

In 1912 a systematic movement was begun for the exportation of Elk from the Yellowstone Park and for the introduction of them into states and localities now destitute of that species. This work is to be continued indefinitely, and many forest areas will thus be stocked.

Size of Elk.—Professor L. L. Dyche, an exceedingly careful observer, has contributed a striking illustration of the difficulty of obtaining from a dead Elk an accurate measurement of the animal's standing height when alive. The largest and finest male Elk ever taken by him (for the State University of Kansas) fell in Colorado on October 21, 1891. I can testify that it is a grand representative of its species.

As is frequently done, the guide of the party measured its height in a line from the *point of the hoof* to the top of the shoulder, and recorded 65 inches. This being ruled out, the bottom of the hoof was held parallel with the axis of the body, and the elbow *even* with the lower line of the brisket. This gave 62 inches. Professor Dyche then pushed the elbow up to the position it occupies in a standing Elk—about five

inches above the lower line of the body—and found the actual standing height at the shoulders to be 57 inches. The head and body length was 97 inches; girth, 73 inches; circumference around abdomen, 81 inches; circumference of neck, 36 inches.

On October 3, 1903, a fine bull Elk in the New York Zoological Park was suffering so intensely from a horn wound in the hock joint that it was chloroformed. Being in fine condition, its measurements and weight were carefully noted, with the following result:

Height at the shoulders	56½ inches
Length of head, body and tail	86¾ inches
Circumference of chest	78 inches

Weight

Trunk	300 pounds
Skin, head and legs	255 pounds
Viscera	151 pounds
Total live weight	706 pounds

Antlers

Length, following curves	53 inches
Widest spread	35 inches
Circumference above bez tine	7½ inches
Points	7+7=14.

Age about eight years.

Rule for Obtaining the Live Weight of Deer from Dressed Weight. So many records of the "dressed" weight of deer are published that it is desirable to offer a simple rule by which any one can accurately calculate the weight of the animal when alive. Taking an antlered Elk (*Cervus cana-*

densis) as a basis, we find that the dressed weight represents .78612 of the live weight, or $\frac{555}{706}$ of the whole animal.

The dressed weight being given, in pounds, add to it five ciphers, divide by 78612, *and the result will be the live weight, in pounds.*

While this rule will often prove convenient, the author desires to state that none of the weights recorded in this volume were obtained by it; and any weight so obtained and published always should be marked "as calculated."

The longest and widest Elk antlers are not necessarily the handsomest. Usually antlers that are of great length are slender, whereas the finest pairs are those of massive proportions, fairly symmetrical, and about 60 inches long. One of the longest pairs in America, so far as known, measures 63 inches in length of main beam, following curve, 64 inches in widest outside spread, between the bez and trez tines has a circumference of $8\frac{5}{8}$ inches, and 6+6 points. It is from Wyoming, and is owned by Dr. John C. Phillips, of Wenham, Massachusetts.

Elk-hunting is not always as fine sport as the noble individuality of this animal would naturally lead the hunter to expect. Very often the Elk is unsuspicious, to the point of stupidity. There have been many times when attacking a herd was too much like attacking a herd of cattle. It is not an animal of "highly-wrought-nervous" temperament, like the deer, but when startled is too much given to hesitating and seeking knowledge, before it dashes away to safety.

During recent years various important steps have been taken, by private individuals only, toward restoring the Elk to the Adirondack forests, which it once inhabited. In 1901,

the Hon. William C. Whitney caused twenty-two head to be liberated there, and in 1902, forty more were set free. In August and September, 1903, five car-loads of Elk, sixty-eight head in all, were shipped from Mr. Whitney's game preserve on October Mountain, near Lenox, Massachusetts, and liberated at Saranac Lake, Floodwood Station and near Paul Smith's Station. All these animals had become fully acclimatized on the Atlantic coast, were in fine physical condition, and up to 1913 they had increased to an estimated total of about 400 head.

The Mule Deer, or Rocky Mountain "Black-Tail,"[1] is a large and handsome animal, the largest of the North American species that are universally known as "deer." It is easily recognized by its very large ears, the two Y's on each antler, *a short, white tail with a small tip of black*, and a white patch around the base of the tail. Its antlers are much larger than those of the white-tailed deer. Owing to their size and width, and their more erect poise on the head, the appearance of this animal is more stately than that of any other round-horned American deer, save the elk.

In the region it inhabits, this fine animal is known as the "Black-Tailed" Deer; but that name is not appropriate to a creature which has a snow-white tail with only a tiny tip of black. It rightfully belongs to the Pacific coast species, which has a black tail, and is known by no other name than Columbian Black-Tail. To avoid further confusion and misunderstandings, nature-lovers are urged to speak of the Rocky Mountain species as the Mule Deer.

[1] *O-do-coi'le-us hem-i-o'nus.*

Painted by Carl Rungius.

MULE DEER IN THE BAD-LANDS OF SNOW CREEK, MONTANA.

The winter color of the Mule Deer is a steel gray, to match the gray rocks and vegetation among which it lives. Its summer coat is gray-brown, and it is shed in September.

The Mule Deer chooses for its home the most picturesque "bad lands" and foot-hills of the Rocky Mountain region, as well as the deep ravines along rivers, but it also ascends the mountain plateaus of its home to an elevation of 12,000 feet. It is a proud-spirited, high-headed animal and a bold traveller; and, like the mountain sheep, it is often found where the scenery is wild and picturesque. In this respect it differs from the white-tailed deer, which prefers low ground and either brush or timber in which to hide.

A large Mule Deer buck, shot by the author on Snow Creek, Montana, measured 42 inches high at the shoulders, and 62 + 6 inches in length. A large pair of antlers (in the author's collection) have a beam length of 27¼ inches, with a spread of 29 inches, and have 14 points.

In the United States the present scarcity of really large antlers in the possession of taxidermists is a sure sign of the approaching end of this species.

In February, 1903, Mr. A. G. Wallihan, the famous photographer of wild animals in their haunts, made the following prediction regarding the impending extermination of the Mule Deer in Colorado, its centre of abundance in the United States:

"Unless we have a close season on deer, five years will see the finish of these animals. Five years would give them a good start again. I will cite you some figures: In 1897 I was on the big trail here for nine days, and I counted within a few of a thousand deer. In 1901 I was on the same trail

for eighteen days, and counted two hundred and twenty-eight deer. In 1902 I was out fourteen days, and counted fifty-two deer. More deer passed in a single twenty-four

FREAK ANTLERS OF MULE DEER.
In the National Collection of Heads and Horns, New York.

hours in 1892-3-4-5 and 6 than passed during the whole month of October, 1902.

"There are a lot of deer, it is true, on the north slope of the divide at Pagoda and Sleepy Cat Mountains, and eastward in the Williams Fork country; but they are practically the remnant. People here say, 'You can't enforce a close-season law.'" (*Outdoor Life* magazine.)

The Mule Deer reaches its largest and finest antler development in the Rocky Mountains, from Colorado to southern

British Columbia. The few widely scattered survivors of this species are found to-day in central Chihuahua and Sonora, Mexico; western Colorado and Wyoming, southeastern Idaho, western Montana, and eastern British Columbia. One fact which militates most strongly against the perpetuation of this species is that states and provinces sufficiently wild and unsettled to afford it a home are financially unable to maintain the large force of salaried game-wardens which alone could really protect it from final annihilation.

This species ranges as far east as western Dakota, and westward to the Blue Mountains of Oregon. Formerly it was most numerous in Routt County, Colorado, where about forty-five hundred were slaughtered as late as the winter of 1900. Unfortunately, on account of its preference for open country, its ultimate extinction in the United States everywhere outside of game preserves is only a question of a few years; for everywhere, save in the Yellowstone Park, it is being destroyed very much faster than it breeds.

The Mule Deer nearly always produces two fawns at a birth, and sometimes three. In feeding it is much given to browsing on twigs and foliage, but it also grazes freely when good grass is available. In the Snow Creek country of central Montana I found that its October bill of fare consisted almost solely of the long-leaved mugwort (*Artemisia tomentosa*), a species of very pungent and spicy sage, which was eaten greedily to the complete exclusion of the finest grasses I ever saw in the West.

In running, this deer often advances by a series of stiff-legged leaps, in which it touches the ground lightly with its

hoofs, bounds upward as if propelled by steel springs, and flies forward for an astonishing distance. In Manitoba and a few other localities this remarkable gait has caused this animal to be called the JUMPING DEER. Owing to the fact

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MULE DEER WITH ANTLERS IN THE VELVET.

that it lives in a dry climate and rarefied atmosphere, and subsists on very dry foods, it is difficult to acclimatize it anywhere outside of its own home. East of the Mississippi most Mule Deer die of gastro-enteritis. This species has not been successfully acclimatized anywhere east of the Great Plains.

The Columbian Black-Tailed Deer,[1] of the Pacific coast, is smaller than the typical white-tailed deer and very much smaller than the mule deer. The outer surface of its tail is black all over, and constitutes the best distinguishing characteristic of the species. The antlers are very variable. Occasionally those of old bucks exhibit the double Y on each beam which is so characteristic of the mule deer; but in most cases the double bifurcation is wanting, and the antlers look very much like those of the white-tailed deer. In its body colors it resembles the latter species more closely than the mule deer.

This species inhabits the well-watered and densely shaded coniferous forests of the Pacific coast from the north end of Vancouver Island to central California. It feeds freely upon evergreen foliage, and I have seen a captive animal, in its native forest in the great natural park at Vancouver, partake freely of the foliage of spruce, Douglas fir and juniper, in rapid succession.

Because of some diatetic peculiarity as yet unknown, the Columbian Black-Tailed Deer is most difficult to successfully acclimatize on the Atlantic coast. After persistent efforts with at least fifteen specimens drawn from Oregon, Washington and British Columbia, and after the loss of all through gastro-enteritis, the New York Zoological Society has abandoned its attempt to transplant the species on an extensive scale. Nevertheless, this species has bred and reared young successfully in the Zoological Park, and specimens are regularly maintained for exhibition purposes.

[1] *O-do-coil'e-us co-lum-bi-an'us.*

In Alaska, this species dwindles still lower into the SITKA DEER,[1] which in stature and antlers is even smaller than the Florida white-tail. It is very abundant on Admiralty Island, but until recently it was slaughtered in great numbers.

THE VIRGINIA DEER, or WHITE-TAILED DEER,[2] was the first member of the Deer Family met by the early settlers of America when they went hunting along the Atlantic coast. It will also be the last of the large hoofed animals of North America to become extinct. It is a forest animal, but in many portions of the Great Plains region it freely risks its life in the thin fringes of cottonwood timber, quaking-asp, and willow brush that border the banks of small rivers and large creeks. Unlike the elk and mule deer, the White-Tail is a great skulker. When hiding it crouches and carries its head low, and by clinging persistently to the friendly cover of brush or timber, saves itself under circumstances that would be fatal to any high-headed, open-ground species.

The White-Tailed Deer derives its name from its very long, bushy, wedge-shaped tail, which is snowy-white underneath and also on the edges. When the animal is alarmed, and running away, this white brush is held stiffly aloft, and with every stride of the bearer, it sways from side to side, in a startling and highly conspicuous manner. While the peculiar mixed gray color of the pelage makes it difficult to see this animal in brushy surroundings, the moment the creature starts to run, its white flag waves as if purposely inviting bullets, and in total defiance of all the laws of "protective coloration" among animals. Indeed, so very flag-like is this

[1] *O-do-coil'e-us sit-ken'sis.* [2] *Odocoileus vir-gin-i-an'us.*

creature's waving tail that in the West many hunters call it the FLAG-TAILED DEER.

There are two points in which this deer differs from all others and by which it can easily be recognized.

1. Its antlers rise a short distance from the forehead, then suddenly *drop forward, with the beam almost horizontal, and*

TAILS OF AMERICAN DEER.

1. Columbian Black-Tail.
2. Mule Deer.
3. White-Tailed, or Virginia Deer. (Small specimen.)

from the beam three long, sharp tines rise perpendicularly. The antlers of nearly all other deer point backward as they rise.

2. *The tail is very long, pointed at the end, bushy near the body and white underneath, as described above.*

The White-Tailed Deer is the best known of all our hoofed animals except the buffalo, because it is the one most widely distributed and has been the longest known. Generally

speaking, it is a United States species, for it inhabits at least a portion of every state and territory save Delaware, Oregon, Nevada, California and Arizona. To-day it is most abundant in the Adirondacks, Maine, Vermont, northern Minnesota and Michigan. Closely related forms of White-Tailed Deer are fairly abundant in Florida, on the lower Rio Grande and in northeastern Washington.

As might naturally be expected, this wide distribution, throughout such a diversity of country and variety of available food, has produced such variations in size that several subspecies have been described. Of the latter, the most important is the dwarf Arizona White-Tailed Deer, extending from southern Arizona southeastward into Mexico to Latitude 25°. This animal, like the Florida White-Tailed Deer, seems to be nothing more than a diminutive race of the more robust northern type, with very small antlers, and the short, scanty pelage which is necessary to the comfort of deer in the tropics.

In such forests as those which cover the Adirondack Mountains of northern New York, where small lakes are numerous, there are three methods of hunting deer.

Hounding deer consists in beating through the forest surrounding a body of water, with a pack of hounds, and chasing the deer until they leap into the water, where they are shot at very short range by men in boats or posted on the shore. It is no credit to any one, save an invalid or a cripple, to kill a deer in this manner, any more than to kill a buck out of season, whose antlers are in the velvet. Any person, no matter how stupid, can be paddled up to a swimming deer

and permitted to blow its head to pieces at short range. Pot-hunters have even been known to catch swimming deer and cut their throats.

In forests like the Adirondacks, frequented by a great many people, hounding deer should never be permitted; and in the wilderness mentioned it is now prohibited by law. In the West Virginia mountains the hunters are posted on the runways of the deer and are obliged to kill them on the run. This requires good judgment and excellent marksmanship, and is legitimate sport.

Jacking or *fire-lighting* is a very picturesque and romantic method of hunting deer, but inasmuch as it gives the game no chance, and calls for very little skill or exertion on the part of the hunter, it is by some considered unsportsmanlike. In the prosecution of this plan the hunter requires a canoe, a skilful paddler, and a good light. With a flaring jack-light held aloft in the bow, the paddler, or guide, sits in the stern of the boat, and noiselessly paddles it through the darkness, around the shores of the lake or river. The hunter sits under the light, and waits for its beams to emblazon the eyeballs of deer standing on the shore, or feeding in shallow water. Often the boat approaches so near a wonder-struck deer that to miss it is almost impossible.

Still-hunting is the true sportsman's method of outwitting deer which for genuine keenness of eye, ear and nose, have, I believe, no superior in the whole Family. One fine old White-Tailed buck killed by fair and square trailing and stalking is equal to two mule deer or three elk. When first alarmed, the mule deer and elk are prone to halt from curi-

osity and stare at the hunter for that fatal ten seconds which so often ends with a ringing "bang" and a fatal bullet.

But not so the White-Tail. Time after time the trailing still-hunter, stealing forward ever so cautiously, sees ahead of him and far beyond fair rifle shot a sudden flash of white, a pillar of cloud swaying from side to side between the tree-trunks, and the vanishing point of a scurrying White-Tail. This creature knows right well that as a discourager of cervine curiosity nothing in the world equals a breech-loading rifle. When he hears behind him a rustle of dry leaves or the snap of a twig, nothing else is so dear to him as space, judiciously distributed between himself and his pursuer. I have sometimes made so bold as to consider myself a fairly good deer-stalker; but I have still-hunted White-Tailed Deer in November, on dry leaves and without snow, when for days and days together I found it utterly impossible to come within fair rifle shot of a buck worth having. At such times a light snow means a fair chance, and properly evens up the game.

During the summer, while the antlers are in the velvet, the coat of this species is short, thin and of a bright sandy color often called "red." In Canada the Virginia Deer is frequently called the "Red Deer"; but this is a mischievous misnomer, for its use always suggests the red deer of Europe. The red coat is worn about three months, say from May 1 to August 1, and then it rapidly gives place to the beautiful mottled brown-gray suit, so long and thick that the owner looks like quite a different creature, and is fitted to withstand the severest winter weather.

The White-Tailed Deer is one of the most persistent

species of the entire Deer Family. Give it suitable ground and full protection, and there is no limit to its increase. On Long Island, where deer-hunting is lawful on only four days

Photo. and copyright, 1902, by W. L. Underwood.

YOUNG WHITE-TAILED DEER.

Showing the conspicuous appearance of the tail when held erect.

of each year, the animals are increasing with surprising rapidity.

In the northern portions of its range from Minnesota to the Adirondacks, where it attains its most perfect development, it is next in size to the mule deer, or Rocky Mountain

"black-tail," and is really a fine animal. A large buck stands 36 inches high at the shoulders, is 53 inches in length of head and body, its tail is 7 inches long to the end of the vertebrae, and 5 inches more to the end of the hair. A fairly large pair of antlers from central Montana are 23½ inches in length from burr to tip of beam, spread 18 inches and have 13 points. A heavy Maine buck is reported to have weighed, before being dressed, 278 pounds.

Usually but one fawn is born each year, in May, which at birth is beautifully spotted, stands 15½ inches high and weighs 4½ pounds.

Let it not be supposed, however, that in the South the White-Tailed Deer of the North necessarily becomes a small or inferior animal. A collection of more than one hundred pairs of antlers from Texas, recently inspected by the writer, contained a surprisingly high percentage of large and heavy specimens, fully equal in length, spread and weight to the best examples from Montana, Minnesota and Maine.

Wild Game as a Source of Revenue.– All persons who pay state taxes in states or territories in which "big game" and game fishes are found, will do well to bear in mind that under certain conditions wild animal life can be made an important and legitimate source of revenue. The United States Supreme Court has decided (Ward *vs.* Race Horse, 163 U. S. 507) that all wild game on unoccupied lands is the property of the state, and that even the National Government may not, either by treaty with Indians or in any other manner save actual sequestration, convey any rights or privileges affecting it adversely.

The states of New York, Maine and Vermont long since discovered that their wild deer constituted valuable state property, and entered seriously upon the task of preserving them from the annihilation that everywhere follows swiftly upon the heels of non-protection. New York elected to preserve the great Adirondack wilderness as a free hunting-ground for her citizens. Maine, with perfectly proper thrift, decided that her game should not only pay the cost of its preservation, but should also be made a legitimate source of annual income for her citizens. All guides must be licensed by the state, no visitor may hunt without a guide, and every non-resident hunter must procure a license, at a cost of $15. This permits the killing of one bull moose and two deer, but no caribou or female moose.

As a result of the game and fish laws of Maine that state becomes every autumn a vast hunting-ground, visited by perhaps ten thousand sportsmen who desire to fish or to procure deer or moose in their haunts. The army of recreationists annually expends within that state a total sum which is usually estimated at one *million* dollars or more. And yet the supply of deer is maintained so successfully that to-day there are in Maine a greater number of deer than anywhere else in the United States, unless it be in the Adirondacks.

In 1910 the United States Biological Survey compiled and published all the facts available showing the number of white-tailed deer killed in the eastern half of the United States during the years 1908–9 and 10. The full statement is as follows:

STATE	1908	1909	1910
Maine	15,000	15,879	15,000
New Hampshire	(a)	(a)	(a)
Vermont	2,700	4,736	3,649
New York	6,000	9,000	9,000
New Jersey	....	(a)	120
Pennsylvania	500	500	800
Michigan	9,076	6,641	13,347
Wisconsin	11,000	6,000	6,000
Minnesota	6,000	6,000	3,147
West Virginia	107	51	49
Maryland	16	13	6
Virginia	207	210	224
North Carolina	(a)	(a)	(a)
South Carolina	1,000	(a)	(a)
Georgia	(a)	367	369
Florida	2,209	2,021	1,526
Alabama	152	148	132
Mississippi	411	458	500
Louisiana	5,500	5,470	5,000
Massachusetts	(a)	(a)	1,281
Total	59,878	57,494	60,150

(a) No statistics available.

DAMAGES BY DEER.—Now that protection is making white-tailed deer numerous in well-settled farming districts of several New England states (Vermont, Massachusetts and Connecticut), and in New York, we begin to hear of damages to crops and gardens. The author is proud to be able to say that in Putnam County, New York, his family garden is annually visited and browsed by real wild deer.

The answer to all questions that may be raised, anywhere, regarding private damages by public deer may be found in the fixed policy of the state of Vermont. In that state the deer population is so great that many cases of real

damage arise for adjustment. It is the state law that each county shall consider the damage claims of its citizens, and pay from the county treasury whatever awards are finally approved. The law works expeditiously, and so satisfactorily that its future seems assured. The whole subject is covered in "Our Vanishing Wild Life," page 241.

By way of illustration it may be stated that in the two years 1908 9 the people of Vermont paid out only $4,865 in compensation for damages inflicted by deer, and in the same period they killed and consumed 7,186 wild deer, worth about $107,790. As a business proposition the soundness of the Vermont basis leaves no room for argument. All that is necessary anywhere in handling damages by deer is a sensible law, honesty and truthfulness on the part of the claimant, and prompt adjustment by the proper county officers. The theory is that the quota of deer killed and consumed in each county affected amply justifies the county in paying damages from public funds. In Vermont the great majority of claims for damages are under $10 each.

The Flat-Horned Deer

The Caribou.—In general terms it may be stated that a Caribou (pronounced car'ry-boo) is a wild deer-like animal, which bears a general resemblance to the domestic reindeer of Europe. Its antlers are long, branching, partly round and partly palmated. Considered as a whole, Caribou occupy the upper half of the continent of North America, over which they are widely scattered above the 45th parallel of latitude.

Next to the musk-ox, the Caribou is the most northerly of

all hoofed animals. It is not only at home on the vast arctic waste above Great Slave Lake, known as the Barren Grounds, but it ranges on northeastward through Ellesmere Land, crosses to the west coast of Greenland, swings around the northern rim of that island, along the edge of the great ice cap, and down the eastern coast, at least as far as Liverpool Bay, Latitude 70°. Doubtless it inhabits the whole coast of Greenland, wherever the naked ridges and valleys of the terminal moraines yield a supply of food: but there is no evidence that it wanders over the vast sheet of lifeless inland ice which covers the interior of Greenland.

A Caribou is at all times an odd-looking creature. Even a very brief inspection is sufficient to reveal the special provisions which Nature has made to enable it to brave the terrors of an arctic climate. The legs are thick and strong, and the hoof is expanded and flattened until it forms a very good snow-shoe. The Caribou walks over snow-fields and quaking muskegs, when the moose sinks in and ploughs through them.

Its pelage consists of a thick, closely matted coat of fine, wool-like hair, through which grows the coarse hair of the rain-coat. It is the warmest covering to be found on any hoofed animal except the musk-ox, or on any animal of the Deer Family. To the touch the new coat of a Caribou feels like a thick felt mat.

The natural food of the Caribou is moss and lichens, and in captivity very few survive many months without the former. The supply of moss for the Caribou and reindeer once kept in the New York Zoological Park came from Maine

and cost in that state seventy-five cents per hundred pounds. A full-grown woodland Caribou consumes about seven pounds daily.

Although up to this date nine species of Caribou have been described, there are but two well-defined groups, the Woodland and Barren Ground. In each of these, several species have been described, but it must be admitted that so effectually do they run together that it is not always an easy matter to distinguish them.

In common with many members of the Deer Family Caribou are distinguished chiefly by their antlers. But even here great difficulties are encountered. With their many tines and points, varying size and forms of palmation, their antlers are subject to thousands of variations. As a result, no two pairs are ever found exactly alike. Between the very long, few-pointed and scarcely palmated antlers of the Greenland Caribou, and the short, many-pointed and widely palmated antlers of the mountain Caribou, every conceivable form may be found.

If ten pairs of adult antlers of each so-called species were collected in its type locality, and the whole ninety mixed in one heap, the utmost that even an expert could hope to accomplish without a heavy percentage of error would be to separate the collection into two groups, one containing the four species of Barren Ground Caribou, the other the five Woodland species.

It is useless to enter here into details regarding each of these nine tentative species. Without a very large collection of specimens and a prolonged study of them, it is impossible

to define the boundaries between the various species that have been proposed. Let it suffice to present a brief outline of the two great groups into which all our Caribou seem to be rationally divisible.

The Woodland Caribou Group

Roaming through the pine and spruce forests and also over the prairies of Newfoundland, Nova Scotia, New Brunswick, northern Maine, Quebec, Ontario and Manitoba, are the Caribou longest and best known to us. A typical specimen[1] is a strong lusty animal, 48 inches high at the shoulders, weighing 280 pounds and endowed with sufficient energy to vanquish the strongest man in about one minute. Its shoulders are high and sharp, its head is held low and thrust straight forward, and as it walks on hard ground its dew-claws and hoofs click like castanets. Its head is long and cow-like, and its muzzle is too large for beauty; but the large, liquid, dark-brown eyes appeal successfully against all adverse decisions on questions of beauty.

When a Caribou walks, its long stride and swinging gait proclaim a born traveller and migrant. And truly, the strangest of all Caribou habits is that which impels these creatures, particularly the Barren Ground species, to assemble in immense throngs, and for climatic reasons migrate *en masse* for long distances. In the Woodland species, however, this habit is not nearly so pronounced.

Character of Antlers.—A comparison of many antlers of Woodland Caribou with those of Barren Ground animals

[1] *Ran'gi-fer car'i-bou*, from Maine.

E. F. Keller, Photo. Reproduced from the Seventh Annual Report of the N. Y. Zoological Society.

WOODLAND CARIBOU.

Adult male specimen in the Zoological Park. Height at shoulders, 48 inches, weight, 280 pounds. For a Caribou as large as this the antlers are small.

reveals one or two points of difference which seem sufficiently distinct to be accepted as constant.

1. Antlers of Woodland Caribou, generally, *are short in the main beam, liberally palmated both on brow-tines and tips,*

ANTLERS OF KENAI CARIBOU.

From photograph of specimen taken on the Kenai Peninsula in 1900, by Harry E. Lee.

and have more than thirty points. As a whole, the antlers have a tree-top appearance.

2. Antlers of Barren Ground Caribou, generally, *are long in the main beam, scantily palmated, especially on the tips, and*

have less than thirty points. As a whole, the antlers have an arm-chair appearance.

If these distinctions between the two great groups of Caribou will not hold good, none will.

The Woodland Caribou of Maine, Ontario and Quebec (*Rangifer caribou*), is the original type of what recently has become a group of species. Its body color is bluish brown and gray, which color also suffuses the neck, head and hind quarters. In October the new coat is of a dark color known as seal brown, quite different from the same pelage in spring.

Originally the Newfoundland Caribou were referred to the species named above, but in 1896 rank was given to them as an independent species (*R. terraenovae*), chiefly on account of their very light color. They are the whitest of all Caribou except the Peary Caribou (*R. pearyi*) of Ellesmere Land.

In 1899 Mr. Ernest Thompson Seton described the Black-Faced Caribou of southeastern British Columbia (Revelstoke) as *Rangifer montanus*, or Mountain Caribou. The new September coat is almost black. The antlers are short, but throw off a surprising array of long tines.

In 1902 the large, dark-colored Caribou of the Cassiar Mountains, in northern British Columbia, was described by Dr. J. A. Allen as Osborn's Caribou (*Rangifer osborni*), the name bestowed being in honor of Professor Henry Fairfield Osborn, the distinguished zoologist of the American Museum of Natural History. This species attains a shoulder height of 55 inches, and is said to be the largest of all Caribou. In

September its coat is so brown the animal has been described as a brown Caribou.

The Kenai Caribou of the Kenai Peninsula—but in 1914 almost extinct in that locality—was described in 1901 as a distinct species and christened *Rangifer stonei*. In September, 1903, the Secretary of Agriculture issued an order prohibiting for five years the killing of Caribou on the Kenai and Alaska Peninsulas. That prohibition later on was continued, but it failed to bring back the species to the Peninsula. By a competent authority it is estimated (1914) that only thirty individuals survive on the Peninsula.

Regarding the distribution and habits of Caribou in the Canadian Northwest, Mr. J. B. Tyrrell, who, while a member of the Canadian Geological Survey, travelled over a greater area of the range of that animal than any other observer known to me, has kindly furnished the very interesting facts quoted below. His letter is dated at Dawson City, September 10, 1903.

"Regarding the portions of the districts of Alberta, Athabasca and Saskatchewan spoken of by you, I am reasonably certain that the Woodland Caribou may be found in all the thickly wooded tracts. This deer is known to the Cree Indians of that country as the 'Muskeg-Atik,' or Swamp Deer, in recognition of the fact that it lives in the swamps and coniferous forests, and not on the plains, or on the country studded with groves of poplar. Now, much of Alberta, and a great part of Saskatchewan, is dry, open country, and into such country Caribou rarely wander.

"This dry, 'bluffy' country extends northwestward

through the western part of Athabasca, but throughout all the *thickly wooded* parts of Athabasca I have no hesitation in saying that Woodland Caribou are not uncommon. They certainly occur along the Churchill River, and I think that their tracks were common along the banks of the Athabasca River, though I cannot definitely remember this,

ANTLERS OF GREENLAND CARIBOU (*R. groenlandicus*).

Showing the form characteristic of the Barren Ground Caribou group. Specimen from the northwest coast of Greenland.

and I have not my note-books here to help me.

"The Indians told me that the Woodland Caribou of the Churchill River and vicinity move northward, and the Barren-Ground Caribou southward in autumn, and that both winter in the same region, in a country where the trees are festooned by a long, black, hair-like lichen (*Alectoria jubata?*). However, I believe

that the Woodland Caribou are not numerous anywhere in the Canadian Northwest Territories, for in all my travels for the Geological Survey of Canada, extending over the period from 1883 to 1898, I did not see a dozen of those animals, though on hundreds of different occasions I saw their great wide-spreading tracks. The only one I ever shot was feeding on a rocky hill, beside a stream that flows into the east side of Lake Winnipeg; and his head is now hanging in the Museum of the Geological Survey, in Ottawa.

"The smaller species of Caribou lives on the Barren Grounds during the summer. On the approach of winter most of the animals migrate southward to the edge of the forest, though some remain throughout the winter on the open barrens.

"Twice, in 1893 and 1894, I met what is known as 'the herd,' on its way southward, once on a good feeding ground, where hundreds of thousands were collected together, and again on a rough, rocky tract where the individual bands rarely exceeded a few hundred in number, and all were on the run."

Barren Ground Caribou Group

Throughout a vast and very hungry sweep of northlands, the BARREN GROUND CARIBOU[1] long has been, and still is, an animal of leading interest and value. To many Indian tribes, such as the Dog-Ribs and Yellow Knives, and to many of the Eskimo tribes also, it has been an important source of subsistence, both in food and clothing. It is so peculiarly

[1] *Ran'gi-fer arc'ti-cus.*

a creature of treeless and inhospitable regions, and is so independent of the conditions which are essential to the existence of all round-horned members of the Deer Family, that its desolate home has been inseparably connected with its popular name. Species may come and species may go, but we hope that the brave and hardy Barren Ground Caribou will go on forever.

It is natural that in any animal species which ranges from the east coast of Greenland to the west coast of Alaska (3,500 miles in an air-line), and from Grant Land to the Churchill River (1,800 miles), some variations in form, color and horn architecture should occur. Indeed, in a range so immense, it could scarcely be otherwise. While it is probable that some of these variations justify the creation of specific divisions, we are at present less concerned with these details than with a consideration of the group as a whole. Moreover, it may be said with entire truth that naturalists have but recently begun to study the Caribou of America; and until far more material has been gathered, it is impossible to set forth the true status and life history of this genus.

The characters which serve to distinguish Barren Ground Caribou from the Woodland groups have already been pointed out,—smaller size, antlers that are longer in the main beam, less palmated and with fewer points. The following forms have been described as independent species of this group; but whether all of them are entitled to specific rank remains to be seen.

Barren Ground Caribou Species

Greenland Caribou, *Rangifer groen-land'i-cus*, Greenland Coast.

Barren Ground Caribou, *Rangifer arc'ti-cus*, Canadian Barren Grounds.

Grant's Caribou, *Rangifer granti*, Alaska Peninsula.

Peary's Caribou, *Rangifer pearyi*, Ellesmere Land.

In view of the tens of thousands of Barren Ground Caribou that have been seen by white men and the thousands that have been killed by and for them, the scarcity of definite observations upon this group and of preserved specimens is, as a whole, very unsatisfactory. At present, therefore, the many undetermined questions regarding the component parts of the group render it impossible to do much more than to define the assemblage as a whole.

In general terms it may be said that the average Barren Ground Caribou is a close under-study of the average reindeer of Siberia and Lapland, and is also a smaller animal. That all our Caribou have descended from the reindeer of Asia and came to us by crossing Bering Strait on the ice, seems more than probable.

In surveyor's parlance, the head of Cook Inlet is the "point of departure" of the Woodland Caribou from the reindeer—Barren Ground type. It would be difficult to find on land a clearer or sharper line of cleavage between two groups of animals than that between *Rangifer granti*, of the Alaska Peninsula, and *Rangifer stonei* of the Kenai Peninsula. One

moment's examination of the types is sufficient to place those species in their respective groups. The antlers of the Kenai Caribou are massive, with many long tines on the terminal half of the main beam. They have 36 points, and a tree-top effect when seen from the front. Grant's Caribou, however, has a long and naked main beam running up to a terminal bunch of short tines, a wide-open, armchair appearance, and only 27 points, all strongly characteristic of the Barren Ground type. The superior size of the Kenai Caribou is confirmatory of the testimony of the antlers of both.

Geographic Range.—The centre of abundance of the Barren Ground Caribou group is midway between the eastern end of Great Slave Lake and the southeastern extremity of Great Bear Lake. This, however, is not the geographic centre of its distribution. The great semi-annual migration is about on a line that might be drawn between Cape Bathurst and the eastern extremity of Great Slave Lake, and undoubtedly the great mass of Caribou on the mainland east of the Mackenzie assemble along that route.

Another line of migration, also from northwest to southeast, passes eastward of Dawson City, and sufficiently near it that great numbers of Caribou carcasses have been sledded into the meat-markets of that city. In 1901 a search of those markets revealed 5,225 pounds of moose and Caribou meat on hand at one time. Along the arctic coast between Point Barrow and the mouth of the Mackenzie, tens of thousands of Caribou have been killed by natives and sold to whaling ships wintering along that coast. As a natural consequence the herds have nearly disappeared from that locality.

Up to the time that Alaska was purchased by the United States the natives had few firearms, or none at all, and Caribou were abundant. Along the west coast Caribou once were so numerous that a cannon from the fort at St. Michael was fired at a herd that passed within half a mile of the settlement. As usual, we immediately supplied the natives with firearms and ammunition; and as a first result, the only Caribou now remaining in western Alaska are the few stragglers that the hunters have not yet overtaken. A few herds of Grant's Caribou still inhabit the treeless wastes of the Alaskan Peninsula.

The great herd seen by Mr. Tyrrell at Carey Lake, west of Hudson Bay, will be mentioned in detail later on. On the Labrador Peninsula there are said to be three distinct herds, on Hudson Straits, Ungava Bay and the Atlantic coast down to Hamilton Inlet. From Ellesmere Land five skins of a white animal with a gray back have been described as PEARY'S CARIBOU,[1] and from at least four points in Ellesmere Land Caribou have been reported.

Along the northwest coast of Greenland, especially between Melville Bay and Kane Basin, Commander Peary found a fair abundance of Caribou, and at Liverpool Bay, on the east coast, a number were killed by a Danish expedition, in 1900.

HABITS.—One of the habits of the Barren Ground Caribou is particularly striking. At stated periods, in spring and autumn, they assemble in immense herds, and migrate *en masse* with the compactness and definiteness of purpose of

[1] *Rangifer pearyi.*

an army of cavalry on a march. This is most noticeable on the Canadian Barren Grounds, which, by reason of its summer pasturage and the absence of water barriers, encourages the display of natural instinct. The observations of several travellers north of the Great Slave Lake have resulted in the belief that "in spring the Barren Ground Caribou seek the coast of the Arctic Ocean, and remain near the salt water until about September." But this idea is much too circumscribed.

The explorations of Mr. J. B. Tyrrell, of the Canadian Geological Survey, have proved conclusively that the universal herd of the Great Slave Lake region does exactly as did the universal buffalo herd of 1871. It moves northward in spring for a given distance only, stops at will, spends the summer and in the early winter moves southward. On July 30, 1893, Mr. Tyrrell saw a vast assemblage of Barren Ground Caribou at Carey Lake (Latitude 62° 10′ and Longitude 102° 45′), nearly 500 miles from the arctic coast. A herd of several thousand animals was composed of females with young fawns, young females and males of all ages, the lofty antlers of the latter being noticeably prominent. This herd was then only sixty miles north of the southern edge of the Barren Grounds.

The most impressive published description of a Caribou migration is from the pen of Mr. Warburton Pike. It is a relation of what he saw on Lake Camsell, sixty miles north of the eastern end of Great Slave Lake, in 1889, and refers to the southward movement to the timbered regions, where the lichens growing upon the trees afford subsistence in winter, when the ground mosses are buried under snow and ice.

"From what I could gather from the Yellow-Knife Indians," says Mr. Pike in "The Barren Grounds of Northern Canada," "and from my own personal experience, it is late in October that the great bands of Caribou, commonly known as *La foule*, mass upon the edge of the woods, and start for the food and shelter afforded by the stronger growth of pine farther southward.

"Scattered bands of Caribou were almost always in sight from the top of the ridge behind the camps, and increased in numbers till the morning of October 20, when little Baptiste, who had gone for firewood, woke us before daylight with the cry, '*La foule! La foule!*' ('The throng'). Even in the lodge we could hear the curious clatter made by a band of travelling Caribou. *La foule* had really come, and during its passage of six days I was able to realize what an extraordinary number of these animals still roam the Barren Grounds.

"From the ridge we had a splendid view of the migration. All the south side of Mackay Lake was alive with the moving beasts, while the ice seemed to be dotted all over with black islands, and still away on the north shore, with the aid of the glasses, we could see them coming like regiments on the march. In every direction we could hear the grunting noise that the Caribou always makes when travelling.

"The snow was broken into broad roads, and I found it useless to try to estimate the number that passed within a few miles of our encampment. We were just in the western edge of their passage, and afterward we heard that a band of Dog-Ribs, hunting some forty miles to the west, were at this very time in the last straits of starvation, only saving their

lives by a hasty retreat to the woods. This is a common danger in the autumn, as the Caribou, coming in from the Barren Grounds, join together in one vast herd, and do not scatter much till they reach the thick timber.

"The Caribou, as is usually the case when they are in large numbers, were very tame, and on several occasions I found myself right in the middle of a band, with a splendid chance to pick out any that seemed in good condition. . . . Notwithstanding all the tall stories that are told of their numbers [the buffaloes], I cannot believe that the herds on the prairie ever surpassed in size *La foule* of the Caribou."

Size and Antlers.—At present the size of the Barren Ground Caribou appears to be a matter of opinion rather than of observation and record. In the hope that some one will come forward and disprove it, I venture to make the assertion that no one ever has weighed a whole, full-grown male specimen. We have a few figures of "dressed" weight, and various "abouts," but really useful facts are lacking. It is currently believed that the Barren Ground Caribou of northern Canada is about one-third lighter than the Woodland species of Ontario and Quebec. If this be true, and we may judge by our own Woodland bull, which unquestionably was a large one (48 inches high; weight, 261 pounds), then the male Barren Ground animal may be set down as weighing 174 pounds. For the Greenland Caribou and Grant's Caribou, this weight surely is too low; for the skulls and skins of both these species indicate a greater weight. On the Alaskan Peninsula Mr. C. H. Townsend weighed a dressed specimen of *Rangifer granti* and estimated very carefully the weight

of the viscera, with the conclusion that the live weight of the animal was 410 pounds.

For their body size, Barren Ground Caribou have very large antlers. They sweep back so far, rise so high and spread so widely that they have the effect of magnifying the height and bulk of the wearer. As will be seen by the following measurements, the antlers of the Barren Ground species are longer than those of the Woodland, but have fewer points and in most cases less palmation. In the series of plates of all species published by Mr. Madison Grant in his valuable paper on "The Caribou" (Report of the New York Zoological Society, 1902), one of the most striking differences between the two groups is the tree-top appearance of all Woodland antlers, and the open, armchair effect of the Barren Ground types.

MEASUREMENTS IN INCHES OF CARIBOU ANTLERS

IN THE NATIONAL COLLECTION OF HEADS AND HORNS, NEW YORK ZOOLOGICAL PARK

			LENGTH OF MAIN BEAM	WIDEST SPREAD	POINTS
GREENLAND CARIBOU	*R. groenlandicus*	W. Greenland	52	41½	21
BARREN GROUND CARIBOU	*R. arcticus*	N. Labrador	52½	41¾	44
PEARY CARIBOU	*R. pearyi*	Ellesmere Land	41¼	27½	24
GRANT CARIBOU	*R. granti*	Alaska Peninsula	62	50	21
KENAI CARIBOU	*R. stonei*	Kenai Peninsula	58¼	39½	40
OSBORN CARIBOU	*R. osborni*	Yukon Territory	62¼	43¼	34
NEWFOUNDLAND CARIBOU	*R. terraenovae*	Newfoundland	51¼	32	26
NEWFOUNDLAND CARIBOU	*R. terraenovae*	Newfoundland	50	44¼	37
MOUNTAIN CARIBOU	*R. montanus*	S. Brit. Columbia	34	28⅞	31

THE REINDEER IN ALASKA.—In 1887 Mr. Charles H. Townsend advised the Government[1] that it would be a very

[1] "The Cruise of the *Corwin* in 1885," p. 88.

beneficial and humane proceeding toward the Eskimo tribes of western Alaska to import a large number of domestic Reindeer from Siberia, and teach the natives how to care for and use them. Through the heroic efforts of Dr. Sheldon Jackson, General Agent of Education in Alaska, this advice was promptly followed, under the auspices of the Bureau of Education; but the first fund of $2,000 came from private sources, and was expended in 1892–3. The initial Congressional appropriation, of $6,000, was expended in 1894, but since 1899 the amount granted annually has been $25,000.

From 1892 to 1902, 1,580 Reindeer were imported from Siberia and 144 from Lapland, from which 6,116 fawns were born in Alaska. Dr. Jackson states that "the animals born in Alaska are developing into larger and stronger animals than their parents." The rumors of alleged deterioration through "inbreeding" are totally incredible, and should receive no attention whatever.

The Reindeer experiment has been wisely conducted, on good business principles, and is an unqualified success. There are forty-nine Reindeer stations, extending from Point Barrow, on the Arctic Ocean, to the Alaskan Peninsula opposite Kadiak Island. The Laplanders who were taken to Alaska to educate the natives in the care and use of Reindeer did their work conscientiously, and the Eskimo have eagerly embraced the opportunity to acquire a domestic animal, good for use and for food, to take the place of the vanished walrus and Barren Ground caribou.

The recently completed tabulation of the returns contained

in the annual reports of the superintendents of the herds shows that there were, June 30, 1913, 47,266 Reindeer in the 62 Alaskan herds, or a net increase of 23 per cent during the fiscal year. This is considered a fair rate of increase, especially since nearly 5,000 Reindeer were killed for food and skins during the year. Only 3,853 of the Reindeer are owned by the Government; 5,047 are owned by missions; 7,834 by Lapps; and the remaining 30,532 are owned by 797 Eskimos and Indians, whose income from the Reindeer industry during the fiscal year was $66,966. The Reindeer belonging to these natives have an estimated value of $763,300. The Government is planning to go out of the Reindeer business as fast as it can train natives for individual ownership, the policy being to encourage independence and initiative among the native population. Distribution of Reindeer is in charge of the United States school-teachers, and it is expected that the Government will dispose of all its Reindeer within the next four years. (U. S. Bureau of Education, 1914.)

On the whole, the systematic introduction of Reindeer along the northwest coast of Alaska—now almost barren of wild life fit for human food—is one of the most humane and sensible measures ever undertaken for the children of the cold. If this industry is further fostered and diligently pursued, its ultimate value in the promotion of the moral and material welfare of the Eskimo is beyond calculation. The multiplication of the herds in the hands of private owners means a great increase in the animal food supply, less dependence upon the foods of civilization, a greater measure of general prosperity and contentment, and, in the end, far less

expense to the Government in the form of annual maintenance for starving natives.

Through the initiative and efforts of Dr. Grenfell, the Reindeer has been successfully introduced in Labrador, for the benefit of the native population.

The Moose[1] is the largest animal of the Deer Family, living or extinct. Even the Irish elk, with antlers which, in at least one specimen, spread 9 feet 2 inches, was a smaller animal. It is a satisfaction to know that the most colossal deer that ever trod the earth is alive to-day, and an inhabitant of our continent.

It is not, however, an easy matter to convey a truthful and adequate impression of this antlered giant of the north. The young specimens occasionally seen for brief seasons in zoological parks and gardens are scarcely more than suggestions of the adult animal. The mounted groups in our large museums do indeed represent its full size; but to be fully appreciated the Moose must be seen alive, adult, full of strength and purpose, striding like a four-legged colossus through the evergreen forests of Canada or Alaska, or swinging away at incredible speed from the dangers of the chase.

Imagine, if you can, an antlered animal standing between six and seven feet high at the shoulders, its legs quite four feet long, its neck and body covered with a heavy thatch of coarse, purplish-gray hair from three to six inches long and its huge head crowned with massive antlers spreading from five to six feet in width. Its head is among the lower branches

[1] *Alces americanus*. Called in Europe, the "Elk"; and our Elk is there called the "Wap'i-ti." See Frontispiece.

of the forest, and its long legs stride with indifferent ease over fallen tree-trunks which to the hunter are barriers to be climbed over, slowly and laboriously.

The Moose can instantly be recognized by its broad, square-ended, overhanging nose, large ears, high hump on the shoulders, and long, coarse, smoky-gray hair. The adult male is further distinguished by antlers that are enormously flattened and expanded, in a form popularly known as "palmation."

The Moose is not a grazing animal, like the elk and most other members of the Deer Family. It lives by "browsing," or eating the bark, twigs and leaves of certain trees, and also moss and lichens. It is strictly a forest animal, and is never found on open, treeless plains. It is very fond of still water, and is much given to frequenting the small lakes and ponds which abound in some portions of its home. It is as fond of wading in shallow water as a boy, and is a ready and powerful swimmer. It loves to feed upon lily pads and stems, and Moose hunters have assured me that it even seeks the bulbs growing in the muddy bottom. In New Brunswick it is very partial to the young trees and bushes that are growing thickly on forest areas that have been burned over and denuded of their timber.

Except in Alaska, the majority of Moose killed by hunters are shot from ambush beside ponds, or from canoes. Frequently Moose that are surprised when wading and feeding in shallow water, make the mistake of rushing into deep water, to escape by swimming, when they are easily overtaken, and either killed, captured or photographed.

In the autumn months the northeastern Moose hunter sometimes makes a horn of birch bark, conceals himself at nightfall beside a pond and imitates the call of the cow Moose until a bull is actually attracted within shooting distance. The cry of this animal is a prolonged, resonant bawl, ending in three or four hoarse grunts.

The map on page 113 shows that the Moose is yet found in northern Maine, New Brunswick, Canada, Manitoba, northern Minnesota, northwestern Wyoming, Idaho, British Columbia, Alberta, Athabasca, Yukon and Alaska. It shows only localities known to have been inhabited recently. In none of these, however, are Moose so abundant as in Alaska, around Cook Inlet. The southern limit of the Moose in North America is the head of Green River, Wyoming, latitude 43°, longitude 110° W., corresponding to the latitude of Albany, New York.

Below Alaska the favorite hunting-grounds for Moose are Maine, New Brunswick, the upper Ottawa River country of Canada and northwestern Manitoba. In view of the great number of hunters—estimated at ten thousand—who annually hunt and fish in Maine, of whom a large proportion hold licenses that permit the killing of one bull, the persistence of the Moose in Maine is really wonderful. At the close of the past century the number of Moose transported by the railways of Maine was as follows:

1894	45
1895	112
1896	133
1897	139
1898	202

1899	166
1900	210
1901	259
1902	244

In comparison with the above figures the following records for the past five years (1909 to 1913 inclusive), kindly supplied by the Maine Commissioners of Fisheries and Game, will serve to show the well-balanced condition of Moose conservation in Maine:

	MOOSE KILLED, AS REPORTED BY GUIDES	MOOSE ACTUALLY SHIPPED BY RAIL
In 1909	239	184
" 1910	227	225
" 1911	253	301
" 1912	143	139
" 1913	111	92

It is a satisfaction to know that for twenty years the Moose supply of Maine has held out practically unchanged. That state, with New Brunswick, seems destined to furnish legitimate Moose hunting—of males only, and only one per year for each hunter—for an indefinite period.

The young of the Moose—always spoken of as a "calf," its mother being called a "cow"—is born in May, and at first is a very grotesque-looking creature. Its enormously long, loose-jointed legs are attached to an abnormally short and diminutive body. The neck is so short that the creature cannot put its nose to the ground without kneeling. Its hair is woolly and brick red, or "sandy," like that of a buffalo calf.

A Moose calf which I once owned and measured when seven weeks old, had the following dimensions:

Height at shoulders	37 inches.
Height at hips	31 inches.
Length of head and body	42 inches.
Depth of chest	11 inches.
Length of fore leg to elbow	26 inches.
Weight	79 pounds.

At one year of age, if not stunted in growth, a Moose stands 4 feet 9 inches to 5 feet in height at the shoulders, where it has developed a lofty hump. On August 14, 1901, the largest of six Moose in the New York Zoological Park, each one about fifteen months old, measured as follows: Height, 5 feet 3 inches; length, head and body, 5 feet 9 inches; length of tail, 3½ inches; depth of chest, 2 feet 2 inches; horns, 4 inches long; weight, 330 pounds.

Any Moose which stands 6 feet 6 inches in height at the shoulders may be considered a very large one, a prize, in fact. The largest Moose of which I have a reliable record was killed in New Brunswick, in 1901, by Carl Rungius, the justly celebrated animal painter, and carefully measured by him with the following result: Height of shoulders, 7 feet, exactly; length of head and body, 9 feet 7 inches; girth, 8 feet; length of head alone, 2 feet 9 inches; antlers small for so large an animal.

The widest antlers recorded came from the Kenai Peninsula and are now in the Field Columbian Museum. They have the following dimensions: Spread at widest point, 78½ inches; greatest width of palmation, 16 inches; circumference of burr, 15 inches; greatest thickness of palmation, 2⅛ inches; length of skull, 28¾ inches; total number of points, 34; weight of antlers and dry skull, 93¼ pounds.

From the foregoing figures, one can imagine the strength necessary to enable an animal to carry such an unwieldy load upon its head and to run at great speed for long distances over the roughest kind of timbered country.

Regarding the weight of adult Moose, very few exact observations have been recorded, or otherwise made avail-

DISTRIBUTION OF THE MOOSE IN NORTH AMERICA, IN 1903.

able. A large Maine Moose killed by W. L. Miller, of Bangor, weighed 1,123 pounds. A dressed carcass weighed by S. L. Crosby showed a weight of 1,009 pounds. (*Recreation Magazine*, IV, p. 89.)

By the time a Moose calf is a year old, it has taken on the colors of adult life, which consist of a mixture of blackish brown on the head, neck and body, and yellowish gray on the legs and under-parts. The hair and mane is long, coarse and stiff, and lies more like a thatch of straw than genuine

hair. On the neck and shoulders it is six inches long. Under the throat hangs a long, ornamental strip of hair-covered skin, four inches long, called a "bell." In the adult male animal this bell is sometimes a foot in length.

The female Moose has no antlers, but in bulk she almost equals the proportions of the male.

In captivity the Moose is naturally a docile animal, not foolishly nervous like most deer, but steady, confiding and affectionate. Moose are easily handled, and trained to drive in harness, and in contact with man manifest more common sense than any other species of deer with which I am acquainted.

Owing to the peculiar nature of the digestive organs of this animal, it cannot live long upon ordinary grass or hay, even when supplemented with the best tree-branches that its own native forests can supply. It is my belief that vigorous daily exercise is vitally necessary to the proper digestion and assimilation of their food. In captivity, even when fed on fresh green browse of the choicest variety, which they eat with relish, they usually die of gastro-enteritis, or inflammation of the stomach and intestines. Green grass is fatal to them, and when fed on grain, hay and vegetables they soon become emaciated and die. Thus far the best results achieved in the maintenance of captive Moose on public exhibition have been in the Cincinnati Zoological Garden, where Superintendent S. A. Stephen has succeeded in keeping a pair for about five years. In great forest preserves, such as Blue Mountain Park, in New Hampshire, Moose do live, thrive and increase. On the Atlantic coast south of

ANTLERS OF ALASKAN MOOSE.

In the National Collection of Heads and Horns, New York Zoological Park. Regarded by the author as the finest of all known moose antlers.

the Adirondacks, the Moose cannot live and thrive, and reach old age, and all attempts to induce it to do so have failed.

In a wild state Moose browse upon many kinds of trees, but particularly upon birch, hemlock, spruce, alder, aspen, willow and maple. They reach the tender tops of tree saplings by walking astride of them, and "riding them down," and in the manipulation of small branches, the use of the overhanging and prehensile nose is strikingly apparent. With their strong lower front teeth, used chisel-fashion, they gouge the bark off large branches, and feed upon it. In grazing on grass, or feeding upon ground mosses, a Moose must kneel in order to reach them.

During the deep snows of winter, Moose herd together in sheltered spots in the forest; and through their moving about in a small area, the snow is trodden down until they form what is called a "Moose yard."

Naturally, because of its grand proportions, and its massive antlers, the Moose has been to every hunter of big game a grand prize. Although difficult to find and approach within easy rifle shot, when approached it is killed easily and without danger. During the past five years this species has been fairly protected throughout the eastern half of its range, and in 1902 this protection was by Act of Congress extended over the whole of Alaska. Without real protection, the world soon will see this magnificent animal, which Nature has been millions of years in bringing to perfection as we now see it, practically exterminated throughout North America. In 1900 the legislature of the state of New

York appropriated $5,000 to be expended in restoring wild Moose to the Adirondack wilderness, from which the species was exterminated by man forty years ago. Up to September 1903, fifteen head of young Moose had been purchased, chiefly in Canada, taken to the Adirondacks and liberated. Unfortunately, this well-meant experiment ended in total failure, and even as early as 1908 not one Moose remained alive in the North Woods.

The Alaskan Moose has obtained a place in the annals of natural history to which its title is, at the least, very questionable. It has been described as a new species (*Alce gigas*), and a giant besides; and because of this, and its really immense antlers, it has dwarfed prevailing ideas regarding the more southern species (*A. americanus*).

For the exaggerated ideas of this animal that now quite generally prevail, its antlers are perhaps chiefly responsible. Occasionally they are of great size and weight, exhibiting enormous spread (from 70 to 78 inches), wide palmations, and also great thickness (from 1½ to 2 inches). Their maximum dimensions considerably surpass those of antlers from more southern individuals. In addition to all this they occasionally show freaky development in the shape and set of the brow antlers; and occasionally the main shovel throws out a palmated spur of striking form and size. Seen from the front, it often happens that the antlers of an Alaskan Moose present a chaotic jumble of tines and palmations. Occasionally these odd forms are also found among the moose of Ottawa and New Brunswick.

But in Alaskan Moose antlers freaky development is ex-

ceptional, and the real type is the same as that found on the moose of Nova Scotia, Manitoba and Minnesota. The finest antlers on record up to this date in the National Collection of Heads and Horns, New York, are perfectly regular. Their measurements are: spread when taken, 76½ inches; spread in 1914, 75 inches; width of palmation, right, 21⅝, left, 18; length in beam, 41½; points 19 + 23. (Page 113.)

Apparently the Alaskan Moose find in summer an abundant supply of some food which is particularly rich in horn-producing properties, and their enormous and freaky antlers are the result.

Regarding the size of Alaskan and other moose, it is well to weigh the best available evidence.

So far as I am informed, the largest moose ever killed and measured by thoroughly experienced and reliable hands is the one already referred to, which was shot in New Brunswick by Mr. Carl Rungius, the painter of American animals, whose knowledge of the external anatomy of that animal is, as many believe, second to that of no other man. The accuracy and fairness of Mr. Rungius's measurements of the animals he has so long studied in their wild haunts are beyond question. According to Mr. Rungius, the moose here referred to stood precisely 84 inches high at shoulders and had a girth of 96 inches; but "for so large an animal its antlers were rather small."

The following measurements of moose, in inches, are of interest in determining the real value of prevailing impressions regarding the Alaskan animal, and its right to specific rank by reason of its great size:

BY WHOM SHOT AND MEASURED	LOCALITY	SEX	HEIGHT AT SHOULDERS	GIRTH	LENGTH OF HEAD AND BODY
Carl Rungius	New Brunswick[1]	Male	84	96	115
Dall DeWeese	Alaska[2]	Male	80¾	91¾	119¾
L. L. Dyche	Minnesota[1]	Male	78½		

Until the enactment of the national law of 1902 for the preservation of wild-animal life in Alaska, the huge antlers of the moose of Alaska threatened to cause the annihilation of the species in that territory. "Record heads" and "record antlers" began to be sought for by those who were able to buy them at high prices, and very promptly moose-killing for heads and horns became an established industry. The unfortunate fact that in many portions of southwestern Alaska moose were easily found and killed bore heavily against them. The Kenai Peninsula partook of the character of a moose "preserve" in everything save preservation.

In 1902, through the combined efforts of naturalists and sportsmen, Congress enacted a law for the protection of the wild animals of Alaska, very wisely charged the Secretary of Agriculture with its enforcement and vested him with wide discretionary power. It was a great day for big game, and for all persons interested in the preservation of our grandest wild animals, when the fauna of Alaska came under the protection of the United States Biological Survey, which is specially charged with the enforcement of the Alaska game law. The killing of moose for salable heads promptly ceased. Excepting by prospectors and natives in great need of food, no moose, white sheep, goat, caribou or big brown bear may

[1] *Alces americanus.*

[2] Largest of several very large male specimens collected on the Kenai Peninsula.

be killed in the close season without a special license signed by the Secretary of Agriculture; nor can any skins, heads or antlers of protected game be transported from Alaska without permits.

At present (1914) Congress makes an annual appropriation of $25,000 for the pay of twelve wardens to protect Alaskan game, but the special killing privileges of the Indians are entirely wrong and should at once be withdrawn. In the killing of game all Indians, and all other natives, should be governed by the same rules as those made to control white men.

THE PECCARY FAMILY

Tayassuidae

The wild swine of the world form a group which contains several remarkable forms.

The wart hog of Africa has a head of such a remarkable form that at first sight it seems like one of the sports of nature. The red river-hog of West Africa is the most beautiful of all swine, and its immaculate red coat, and long, slender ears produced to infinity in the form of a waving pencil of threadlike hairs, renders this animal acceptable in any zoological garden.

THE COLLARED PECCARY[1] is our nearest and best-known representative of the wild swine. Its northern limit is the Red River and the valley of the Rio Grande, in Texas, and southward it ranges to Patagonia. In northwestern Sonora it has recently been obtained by Dr. D. T. MacDougall

[1] *Tay'as-su ta'ja-cu.*

in regions so dry, hot and barren of vegetation that it was a surprise to find it there. Its preference is for brushy, upland jungles, but at the same time it frequents all available cover, from the fruitful hard-wood forests of Arkansas and Texas to the moist and hot jungles of Central and South America.

COLLARED PECCARY.

In Texas this animal is called the "JAVELINA," and hunting it on horseback with dogs is a sport not to be despised. When hotly pursued, the Peccary of Texas gladly dives into any rocky crevice or hole that is large enough to receive it. Both jaws of this animal are provided with tusks, of sufficient length and sharpness to make them dangerous weapons.

The courage and pugnacity of the Peccary are well known, and when threatened with attack by a drove, the boldest hunter does not hesitate to climb the best tree that happens

to be available. An enraged Peccary, athirst for blood, is to any one not armed with a rifle or a first-rate spear a formidable antagonist. But for their tusks and dauntless courage when attacked, these animals could not have long survived in forests infested by savage jaguars, pumas, wolves and ocelots. Truly, it seems as if this species represents the survival of one of the fittest.

In our southwestern states the regular food of the Peccary consists of acorns, pecans, farmers' crops, seeds and edible roots of many kinds, and (it is said) also frogs, lizards, snakes and all other ground animals it can catch. If the musk gland situated on the top of the hind quarters is cut out as soon as a Peccary is killed, the flesh will be saved from the musky flavor and odor which without this precaution would soon render it unpalatable.

The Collared Peccary derives its name from a ribbon-like band of white which encircles the animal about where the neck joins the shoulders. Other than this, the hair is of a black color, sprinkled with gray.

The White-Lipped Peccary[1] is a much larger species than the preceding, with white hair on its upper lips. It is found only as far north as southern Mexico, but ranges southward to Paraguay.

Living specimens rarely reach zoological gardens, and during the first thirteen years of its existence the New York Zoological Park never succeeded in securing even one specimen.

[1] *Tay'as-su al-bi-ros'tre.*

THE TAPIR FAMILY

Tapiridae

In all the world there are at least five species of tapirs, only one of which is found in the Old World. We know of

AMERICAN TAPIR.

the existence in southern Mexico and Central America of a species called Baird's Tapir (*Tapirus bairdi*), and in Central America there is one known as Dow's Tapir (*Tapirus dowi*), but of their life histories very little is known, and at present it is impossible to describe them adequately.

The South American Tapir[1] is so frequently seen in captivity, and is already so well known, that it may well be

[1] *Tap'i-rus ter-res'tris.*

chosen as the representative of the only Family of odd-toed Ungulates existing on this continent. It takes kindly to captivity, grows rapidly, and always manages to look well-fed, and as sleek as a seal. Its color is a rich mahogany brown, its head is long and triangular, and its long, prehensile nose, ever soliciting something to eat, is strongly suggestive of the end of an elephant's trunk. The shoulder height of a full-grown animal is about 37 inches.

The species best known to the world inhabits Venezuela, the Guianas, Brazil, Paraguay, Uruguay and the northern portion of the Argentine Republic. Although tapirs are usually found along small and well-shaded rivers in the hot lowlands of the tropics, they are also frequently found on forest-covered mountains. They are exceedingly shy and wary, and under all circumstances are difficult to find. Without dogs it is almost impossible to outwit them. When attacked they always head for the nearest stream, and plunge into the water for concealment. Their food consists of soft and fleshy plants which grow in or within easy reach of streams and in dense forests where the humidity is great. The flesh of all tapirs is said to be very palatable, and in South America it is much sought by hunters.

The South American Tapir thrives in captivity, either with a bath-tank or without, and breeds. In 1903 a pair bred in the National Zoological Park, at Washington, and the offspring survived.

CHAPTER IX

ORDER OF THE HYRAX, OR CONEY

HYRACOIDAE

THE HYRAX FAMILY

SURELY Nature was in a sportive mood when this absurd little Order was pieced together like a block for a crazy-quilt and given to the world. No wonder it puzzled the early solons of the zoological line; but it is a joke of jokes in classification that any systematist should have solemnly classed it with the pachyderms, or thick-skinned animals. It was like associating our pika with elephants and rhinoceroses.

THE CAPE HYRAX (*Hyrax capensis*) taken singularly, looks like a little dingy-brown rabbit, in size half-way between a cottontail and a jack rabbit. In structure it is indeed fearfully and wonderfully made. It has plantigrade feet, like no other animal than itself; it has molar teeth and various bones like a rhinoceros; its lower incisors are like those of a hippopotamus, and in the great number of its dorsal vertebrae it is like a sloth. Its tail is nothing but a small tubercle. In appearance it looks like a cross between a Rocky Mountain pika and a woodchuck, and in its haunts and habits it is thoroughly like the pika of the slide-rock.

To contain this strange genus and its twelve or fourteen species, a whole mammalian Order had to be created. The exact number of species that should be recognized is unknown, but at all events there are as many as twelve. For the two species that live in trees, another genus (*Dendrohyrax*) had to be created. The Hyraxes inhabit eastern Africa all the way

CAPE HYRAX.
Photographed from life. In the New York Zoological Park.

from Cape Colony to Abyssinia and beyond, and one species is found in Syria. Westward the genus extends across Central Africa to the island of Fernando Po. In elevation they range from sea-level up to mountain-tops eleven thousand feet high. In mountainous districts their haunts and habits are in general terms like those of the pika of the Rockies (*Ochotonys*). To escape their very numerous enemies they hide in rocky burrows, preferably in slide-rock; and they feed in the early morning or at night. Their food consists of roots, grass, leaves

and the tender shoots of bushes. When alarmed, they squeak shrilly and dive into their rocky burrows, out of which no animal can dig them.

The Hyrax of Syria is beyond doubt the "coney" of the Bible. The color of the Cape Hyrax, which is the species most frequently seen in zoological gardens, is sooty brown, with a large black spot on the back; and the hair is soft, fine and of good length. The incisor teeth are triangular, and their terminal edges are sufficiently sharp to inflict an ugly little bite. In January, 1914, five specimens were living in the New York Zoological Park. A full-grown animal is about 14 inches long and 7 inches high at the shoulders.

This strange little Order contains the smallest membership of any of the great mammalian orders, and we are indebted to Professor Huxley for correcting the notion that the Hyrax belonged in the (obsolete) Order Pachydermata.

CHAPTER X

ORDER OF THE ELEPHANTS

PROBOSCIDEA

ONCE upon a time, after the glacial epoch had ceased to cover the northern third of the world with a skullcap of solid ice a hundred feet thick, elephants roamed over a considerable portion of North America, browsing on the hemlocks and cedars that were striving to reforest the great devastated area. Indeed, it may be said that our country literally was the chosen stamping-ground of all the elephant species existing in North America twenty thousand years ago. The mammoth of the North (*Elephas primigenius*) ranged up to Point Barrow and Bering Strait, but the other species were particularly at home in the United States.

To-day the fossil remains of the three mammoths and the mastodon are scattered from Cape Cod to the Golden Gate, and wherever a bog is drained and excavated it is in order to look for them.

Few, indeed, are the museums of America which contain no fossil remains, at least in molars or tusks, of the two genera, *Mastodon* and *Elephas*, of North America. On the whole I believe that more American people have seen skeletons or teeth of the American mastodon than have yet seen adult specimens, living or dead, of the big brown bears of Alaska.

The Mastodon (*Mastodon americanus*) is the oldest member of the American elephant group, and to us it is also the best known. It lived in the geologic age known as the Lower Pleistocene, and disappeared in the Upper Pliocene, when the mammoths were at their best. This species occupied practically the whole of the United States, oddly confining itself to our country except for the broad wedge of distribution that ran up from southeastern British Columbia to Lake Winnipeg, and thence down to Lake Superior. Stragglers wandered to Nova Scotia and Yukon Territory.

You can recognize a molar of a Mastodon almost as far as you can see it, by the four or five very high and bold saw-tooth ridges that extend across its top from side to side. The molar of any species of *Elephas* is *flat on top*, with very low and narrow cutting plates of enamel extending across it.

The skull, tusks and skeleton of the Mastodon are so truly elephant-like that if a complete skeleton were labelled "African elephant" not more than one person out of every thousand would notice the error except by observing the crowns of the molar teeth. It seems to be accepted as a fact that the Mastodon was covered with a coat of coarse hair. In size it was practically the counterpart of the Indian elephant. The adult males of both these species may fairly be put down as being 9 feet 6 inches in shoulder height; but it is known that on rare occasions an exceptional giant did exceed those figures. Mastodon tusks vary in length from 6 feet up to 10 feet, the latter figure being the maximum.

The state of New York has been quite prolific in the production of Mastodons, and the bogs of Ulster and Orange

counties were singularly successful in the preservation of their fossil remains. The "Cohoes Mastodon," also called the

COLUMBIAN MAMMOTH.
Restoration by R. B. Horsfall after W. B. Scott from skeleton in American Museum of Natural History.

"Warren Mastodon," is, with palaeontologists, literally a household specimen, for it was the first and most perfect skeleton to be brought prominently into notice. The many deep and soft bogs that lie between the north and south granite ridges

of southeastern New York undoubtedly still entomb the fossil remains of many an undiscovered Mastodon, hermetically sealed and awaiting the steam-shovel of the modern excavator.

The Mammoths of North America were true elephants, and three species are known.

The Imperial Mammoth (*Elephas imperator*) was a great, long-haired giant of giants; for at the shoulders he attained the amazing height of 13 feet 6 inches! In the museum of the Chicago Academy of Sciences there stands the skeleton of a Mammoth that appears to have had a living height of at least 13 feet. Tusks of Mammoths have been found in Alaska measuring, so it is reported, up to 11 feet in length.

The fact that the Mammoths were covered with long, very coarse hair, of a dark-brown color, has been thoroughly established by the discovery in northern Siberia, fast frozen in great masses of ice and earth, of several mammoth carcasses in the flesh! To dogs and unimaginative men of the hardy north Siberia variety, some of this flesh was edible; and some of those specimens yielded excellent skeletons for the museums of Russia.

The Imperial Mammoth, excepting for a long, wedge-shaped excursion reaching far down into Mexico, was strictly an animal of the western half of the United States. Its eastern boundary reached only to western Missouri and Arkansas.

The Columbian Mammoth (*Elephas columbi*) was almost precisely of the same size as the largest living African elephants, 11 feet at the shoulders. A very fine mounted skele-

ton in the American Museum of Natural History stands 11 feet in height, and its remarkable incurving tusks have an extreme length on the curve of 11 feet 5½ inches. It is from the Pleistocene of Indiana. As it stands it requires a reading

AFRICAN ELEPHANT "JUMBO."
Actual height at shoulders, 10 feet 9 inches (1883).

of the label to assure the visitor that it is not an ancient skeleton of a modern Jumbo.

The geographic range of the Columbian Mammoth affords a curious exception to the rule of elephant distribution in North America. It is almost coincident with that of the American and Alaskan moose! From New Brunswick and Maine it sweeps across the continent, covering the northern United States and much of southern Canada to Vancouver. Thence it extends northwestwardly throughout the Rocky

Mountain region and the Coast Range to the extreme limits of northern and western Alaska. In Alaska the tusks and bones of this species are quite common. In northern Siberia mammoth tusks have for many years been so common that they have formed a staple article of commerce.

In the caves of southern France and Spain there are many drawings of Mammoths (as well as of aurochs, wild boars, horses and reindeer), crudely executed, to be sure, but so thoroughly characteristic as to be quite unmistakable. In the cavern at Font-de-Gaume there is a strong drawing of a procession of four Mammoths and other animals. Some of these drawings were made perhaps forty thousand years ago, and they are well preserved. (See *American Museum Journal*, December, 1912.)

Near Doylestown, Pennsylvania, there was found in 1872 a stone which bore on one of its sides a crude engraving of an elephantine animal being attacked by men. This is known to history as "the Lenape stone."

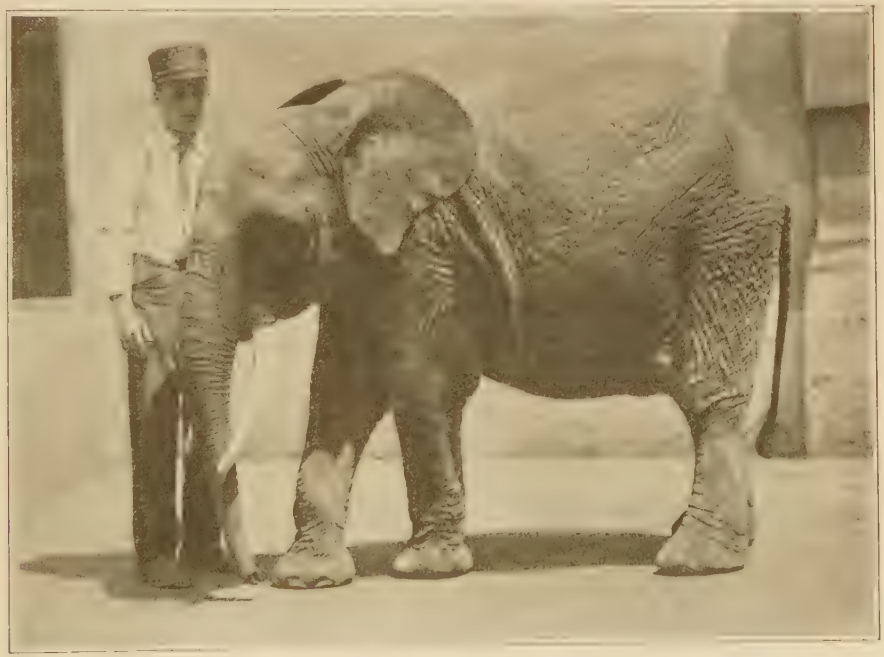
Truly "there were giants in those days," and primitive man struggled with them for the survival of the fittest.

LIVING SPECIES OF ELEPHANTS

Of the elephant species living to-day we will mention the three that are most important.

The Sudan African Elephant (*Elephas oxyotis*) is one of the largest of the seven well-recognized species of elephants inhabiting Africa to-day. As its name implies, it is a habitant of the great region in central East Africa vaguely known as "the Sudan." The two half-grown specimens in the New York

Zoological Park were caught on the Blue Nile, in 1905, soon after they were born. This species is specially distinguished by its enormous ears. It attains a shoulder height of 11 feet 4 inches. The enormous world's-best-record pair of tusks in



PYGMY AFRICAN ELEPHANT.
Adult male type. Specimen in the New York Zoological Park.

the National Collection of Heads and Horns, New York Zoological Park, from this species, have a length on the curve of 11 feet 5½ inches, and the pair weigh 292 pounds. Their greatest circumference is 18 inches, and in curves and symmetry they are remarkably beautiful.

"Jumbo" was the largest African elephant known in captivity during historic times. His advertised "showman"

height was 12 feet, but his actual standing height was precisely 10 feet 9 inches. He was carefully measured in 1883 at Madison Square Garden, New York, by Mr. Robert Gilfort, now living in Orange, New Jersey.

INDIAN ELEPHANT.

The large species of African elephants have been so long and so relentlessly pursued by the murderous ivory-hunters, both white and black, that now it is almost an impossible task to find a full-grown bull, or to find one with a pair of tusks even approaching six feet in length. Possibly the species can be perpetuated by the young stock, but all experienced stock-breeders surely will regard it as very unlikely.

THE PYGMY ELEPHANT (*Elephas pumilio*). Of this recently discovered and recently described species (1905) from the French Congo territory, equatorial West Africa, the type specimen is living in the New York Zoological Park. As its name implies, it is a very small species, probably never exceeding 7 feet in height, even if that height is ever attained. It is characterized by small, round ears, five toes on each fore foot and four on the hind foot, which is one more than the numbers worn by the large African species.

At the time of his arrival (1905) "Congo" stood 43 inches in shoulder height, and his age was estimated at seven years. His weight at that time was 601 pounds, and his tusks were 4 inches long. On June 1, 1911, his height was 60 inches, his tusks were 23 inches long outside the lip and he appeared to be fully adult.

Regarding the life history and distribution of this very odd species much remains to be ascertained.

THE INDIAN ELEPHANT (*Elephas indicus*) still exists in a wild state in several widely separated localities of India, Burma, Siam and the Malay Peninsula. But for rigid protection, the species very probably would have been exterminated ere this.

This species is too well known to require description. Its shoulder height for adult males may safely be put down at 9 feet 6 inches, even though occasionally a giant may seem to exceed that figure.

CHAPTER XI

ORDER OF WHALES AND PORPOISES

CETE

TO some persons who are beyond the reach of large museums, or a complete work on natural history, the whales, dolphins and porpoises seem very far away. To those who live far from the sea, it might seem justifiable to omit them from our list; but, inasmuch as all Americans travel, and nearly every reader of this book is certain to observe some of the great sea-mammals disporting in the waves of their ocean home, it is necessary to give them a brief notice.

The salt waters of the world are inhabited by what is really a great array of species of fish-like mammals, some of which are the largest creatures that ever inhabited the earth. It is a satisfaction to know that even the largest of the great extinct lizards of North America did not equal the gigantic bulk of a ninety-foot sulphur-bottom whale of our Pacific coast.

Although the Cetaceans are very fish-like in form, and also in mode of life, they are warm-blooded mammals, which breathe air instead of water, drown if submerged too long, bring forth their young alive, and nourish them with milk from their own bodies. For the protection of their flesh and vital organs from the cold of Arctic waters they are com-

pletely enveloped in a thick layer of fat, called "blubber," which lies under the skin, and is impervious to cold. It is as if a man had a layer of felt an inch thick under his skin.

All Cetaceans are destitute of hair, and in most cases the skin is as smooth as plate glass. The great majority of them have teeth, but many are toothless. Except the whales of greatest commercial value, little is known of the habits of Cetaceans generally. It is very difficult to study creatures that make their home in the sea and that can be closely studied only when killed. Nevertheless, quite a number of interesting facts regarding these strange animals have been brought together, chiefly by observing whalers. Their four Families are as follows:

CETACEANS

Cete

FAMILIES	
1. BALEEN WHALES: (without teeth) *Balaenidae*....	"Whalebone" Whales, of large size, without teeth. The mouth is provided with "baleen," commercially called "whalebone." This group includes the *Sulphur-Bottom*, largest of all whales, and about fifteen other species.
2. SPERM WHALES: (with teeth) *Physeteridae*...	Whales with a narrow, beak-like lower jaw, and *formidable* teeth. There are four species, varying in size from the *Pygmy Sperm Whale*, 12 feet long, to the great *Sperm Whale*, 80 feet long.
3. DOLPHINS and PORPOISES: *Delphinidae*...	This Family includes about thirty species of *Dolphins*, *Porpoises*, *Grampuses*, *Blackfish* and *Narwhals*. They vary in size from the five-foot common Porpoise to the thirty-foot Orca, or "Whale-Killer." All save a very few are harmless, but the Killer is the most savage and dangerous creature that swims the seas.
4. FRESH-WATER DOLPHINS: *Platinistidae*..	The narrow-beaked dolphins of the Amazon and Ganges.

THE FAMILY OF BALEEN WHALES

Balaenidae

If seen on land, any member of this Family would recall Falstaff's graphic reference to his own fleshy self,—"A mountain of mummy!"

In one respect, a large whale is like an iceberg. When seen in the water, only a small fraction of its bulk appears; the remainder must be imagined. On the ocean, one sees nothing of a whale save a rather flat back and a jet of dense vapor rising and curving back into the sea. Startling indeed would be the sight of a whale's bulk, if it could be seen in its entirety.

The largest and also the swiftest of all whales is the great Sulphur-Bottom Whale,[1] of the Pacific Ocean, found from northern California to Central America. So far as we know, this is the largest animal that ever lived upon this planet. Captain C. M. Scammon, one of the most observant and scholarly of all whalers, records the measurements of a specimen taken by him as follows: Total length, 95 feet; length of jawbone, 21 feet; girth, 39 feet; length of longest "whalebone," 4 feet; weight of "whalebone," 800 pounds; calculated weight of whole whale, 294,000 pounds; barrels of oil yielded, 110—not a large quantity.

The accompanying illustration shows the form of a baleen whale, and the peculiar outline of its enormous mouth. The whales of this Family live upon minute shrimp-like crustaceans, and swimming mollusks (shell-fish) belonging to

[1] *Bal-ae-nop'ter-a sul-fu're-us.*

the group known as pteropods (ter'o-pods) which float in myriads on or near the surface of the sea. To enable the sea-monster to feed upon these very small organisms, and secure them in a wholesale way, the roof of the mouth is provided with two great masses of thin, horny plates set edgewise on each side, and very close together. The lower edges of these plates (of "whalebone") are frayed out into a mass of what looks like coarse, bristly hair, and these frayed edges unite into a web of filaments as long and as wide as the whole inside of the mouth.

In feeding, the whale swims through a mass of floating pteropods, with its mouth open; and the fringe of the baleen, hanging down upon the sides of the lower jaw, forms a perfect strainer for catching even the smallest creatures afloat. The pteropods gather in a mass on the tongue, and presently are swallowed. When the mouth is shut, the plates of baleen fold in diagonally.

Captain David Gray has stated that sometimes the whale finds its food under water, at a depth of from sixty to ninety feet. In gathering it the animal dives, holds its breath like any air-breathing animal, and after an interval reappears at the surface to breathe, swallow the food collected, and rest before diving again. When whales are feeding in this manner, it is comparatively easy for whalers to approach them within striking distance and harpoon them.

One of the most astonishing statements recorded of this animal is that sometimes when harpooned, and sometimes in sport as well, it leaps out of the water for practically its entire length! Captain Scammon states that a pair of Sulphur-

Bottom Whales have been known to float side by side at the surface of the water, and caress each other by striking each other's bodies with their flippers, "the sound made by these gigantic love-pats being audible for miles."

The young of a whale is called a "calf," and usually the mother is very solicitous for the welfare of her offspring. She suckles it until it is able to seek other food than her milk.

The Bow-Head Whale, also called Greenland, and Polar Whale,[1] of the north polar seas, is known by the immense size of its head and the semicircular arch of its jaws. Its individual plates of baleen are sometimes 10 to 12 feet in length. This material is now scraped very fine, and mixed with the silk fibre of dress silks in order to make the cloth rustle when worn, and also to give it stiffness. It is now of such high value commercially that the baleen whales are being pursued as far north as vessels can go. When a vessel is having a run of luck and is striking Bow-Head Whales frequently, the oil is sometimes completely ignored, and the quest settles down to a hunt for whalebone alone.

Whale oil is no longer the valuable commodity it was fifty and more years ago, but the hunt for baleen will ultimately exterminate all the whales of this Family. The Bow-Head Whale is of medium size, rarely attaining 65 feet, and usually runs under 50; yet it is uncommonly rich, both in baleen and oil. A large whale of this species is said to yield 275 barrels of oil, and 3,500 pounds of whalebone.

On the coast of Newfoundland there are now five whaling stations which during the summer season do a thriving busi-

[1] *Bal-ae'na mys-ti-ce'tus.*

ness. Small whales of two or three species are killed in adjacent waters, towed to the stations, and hauled up on ways. In a single day a whale forty feet long is completely worked up, and practically every part of the animal yields a commercially valuable product.

When a whale is struck by a harpoon, it dives deeply to escape its foes, and remains under water as long as possible.

BOW-HEAD WHALE.
Balaena mysticetus.

The comfortable period for a whale to remain under water is fifteen minutes, but in feeding below the surface, this is often extended to twenty-five minutes. Harpooned whales sometimes descend 300 feet and lie on the muddy bottom of a shallow sea for a period of from fifty minutes to an hour and twenty minutes.

But whalers know that their victim must sooner or later come to the surface or drown. As a whale reaches the surface, it immediately discharges its breath from the blow-holes situated on top of its head. A whale does not spout water, but the breath which comes from its lungs is so heavily laden with moisture that at a little distance it looks like water,

especially when it curves over and falls into the sea. It is this "spouting" which reveals the whale to its enemy in the "crow's-nest" of the whaling vessel, and causes him to shout joyously to those on deck, "There she blows!"

In addition to the foregoing, the most important species of baleen whales are these:

The Right Whale (*Balaena glacialis*), of the cool waters around the north pole and the Atlantic Ocean, north and south, attains 70 feet, but usually runs under 50 feet.

The Pacific Right Whale (*Balaena sieboldii*) inhabits the North Pacific.

The Humpback Whale (*Megaptera nodosa*), of the Atlantic, off the United States coast, is the species most frequently seen from the decks of passenger steamers and occasionally stranded on our coast. Its usual length is from 45 to 60 feet.

The Finback Whale (*Balaenoptera physalus*), of the North Atlantic coast, attains 60 feet, but yields little oil, and is difficult to kill.

The California Gray Whale (*Rachianectes glaucus*), from the arctic seas to Lower California, attains 45 feet. It is fond of shallow water and is savage and dangerous.

THE SPERM WHALE FAMILY

Physeteridae

It is impossible to give in a few words a clear and adequate conception of the various localities inhabited by the great Sperm Whale.[1] It may be said, however, that it is

[1] *Phys'e-ter mac-ro-ceph'a-lus.*

a habitant of the warm seas of the globe, from the North Atlantic, around Cape Horn, to the North Pacific.

The Sperm Whale has an enormous, square-ended head, which constitutes one-third of its entire bulk. Under this great mass is the lower jaw of solid bone, shaped like a letter Y, the stem being fully armed with a double row of huge, conical teeth. In comparison with the great bulk of the head, the lower jaw seems absurdly small; but it is a formidable weapon, and whalers dread it.

In seizing a whale-boat, a man struggling in the water, or any other dangerous enemy, a Sperm Whale turns on its side or back, like a shark, in order to bring its lower jaw over its victim.

The largest Sperm Whales have measured from 80 to 84 feet. At birth they are from 11 to 14 feet long. Their food consists of fish of various kinds and also squid. A young whale, only 20 feet long, which was taken on the coast of Cornwall, had in its stomach about 300 mackerel. The head of the Sperm Whale yields sperm oil, spermaceti and teeth which are valuable for ivory. A substance called ambergris, of much value to druggists and perfumers, is occasionally found in the intestinal canal.

The Sperm Whale Porpoise, or "Pygmy Sperm Whale" (*Ko'gi-a*), is found on both the Atlantic and Pacific coasts of the United States. It is a true pygmy, adult specimens being but 15 feet long. They are so rare that their existence in the western Atlantic Ocean was not known until 1883, when a specimen was washed ashore at Spring Lake, New Jersey, and secured by the United States National Museum.

THE DOLPHIN AND PORPOISE FAMILY
Delphinidae

This Family contains a number of different groups of animals, some of which are sharply distinct, and are not called by either of those names. The porpoises are distinguished by their blunt noses and the dolphins by their long, pointed noses and elongated, beak-like jaws. Unfortunately for our purpose, there are a few porpoises with long snouts, and a few dolphins with short, blunt noses; and consequently the two groups run together so confusingly that it is impossible to lay down any rules by which one may always be distinguished from the other. We shall therefore shorten our work by setting forth the species most worth knowing and by leaving the anatomical details of the different genera to be learned in the future.

The White "Whale," or Beluga,[1] of the upper half of the northern hemisphere, is not really a whale, but a member of the Dolphin Family. It is creamy white all over, and 16 feet long; has several times been exhibited in aquaria and shows, and is known personally to millions of Americans. One of the fine specimens exhibited in the New York Aquarium in 1897 met its death from suffocation caused by a live eel becoming immovably fixed in its blow-hole, and shutting off its breath so suddenly that the mammal died before the fish could be removed. This species ascends the Yukon River, Alaska, for 700 miles, and is also an inhabitant of the St. Lawrence. Dr. Goode states that the food of the

[1] *Del-phin-ap'ter-us leu'cas.*

White "Whale" consists of such fish as flounders, halibut, cod, salmon and eels, and also of squids and prawns. In the St. Lawrence River there is a fishery of considerable importance.

The Blackfish[1] is not a fish, but a jet-black member of the Dolphin Family, 15 to 18 feet long, and is shaped very much like a small sperm whale. The head has the same square-ended, sawed-off appearance, and a barely perceptible snout. It is one of the most abundant and important of the small cetaceans of the east coast of North America. Thousands of them have been stranded, or deliberately driven into shallow water, on Cape Cod, sometimes over a hundred in one school. The yield of oil from a single Blackfish varies from ten gallons to ten barrels. The jaw yields a fine quality of oil much used for sewing-machines and known as porpoise-jaw oil. The value of a stranded Blackfish on Cape Cod varies from $5 to $40. (G. Brown Goode.)

Once on a voyage from South America to New York, we sighted a large school of Blackfish, travelling south and playing by the way. Some chased each other, lazily, and half a dozen of them stood on their tails in the water, perfectly erect, with their heads six or seven feet high in the air, as if to look at the ship. Those so standing looked like big, black posts, all ready for wharf-building.

The Grampus, or Cow-"Fish,"[2] of our Atlantic coast inhabits the same waters as the preceding species, but is not nearly so numerous or so stupid in getting stranded in

[1] *Glob-i-ceph'a-la me'las.* [2] *Gram'pus gris'e-us.*

shallow water. Its color is slaty gray, variegated with irregular white markings, and its length is from 15 to 20 feet.

The Killer "Whale," or Orca,[1] is the demon of the seas. This creature has the appetite of a hog, the cruelty of a wolf, the courage of a bulldog and the most terrible jaws afloat. Its teeth are surpassed in size only by those of the sperm whale. It attacks whales of the largest size, and devours sea-lions, seals and small porpoises as a hungry longshoreman destroys saddle-rock oysters.

A full-grown Killer is from 16 to 20 feet in length, and can always be recognized by the great height of its back fin. The all-black High-Finned Killer, of the Pacific only, has a back fin six feet high. The colors of *Orcinus orca* are those of the pirate's flag of skull-and-cross-bones,—black and white, disposed as shown in the accompanying illustration. This species is found on both coasts of North America and in the Arctic Ocean.

The following quotation from Captain Scammon is the testimony of an eye-witness of the Orca in action:

"Three or four of these voracious animals do not hesitate to grapple with the largest baleen whale. The attack of these wolves of the ocean upon their gigantic prey may be likened in some respects to a pack of hounds holding a stricken deer at bay. They cluster about the animal's head, some of their number breaching over it, while others seize it by the lips, and draw the bleeding monster under water; and when captured, should the mouth be open, they eat out its tongue.

"We once saw an attack made by three Killers upon a cow

[1] *Or-ci'nus or'ca.*

CALIFORNIA GRAY WHALES ATTACKED BY KILLERS.
Drawn by J. Carter Beard, from Captain Scammon's narrative.

whale and her calf, in a lagoon on the coast of California, in the spring of 1858. The whale was of the California gray species, and her young was grown to three times the bulk of the largest Killers engaged in the contest, which lasted an hour or more. They made alternate assaults upon the old whale and her offspring, finally killing the latter, which sank to the bottom where the water was five fathoms deep. During the struggle the mother became nearly exhausted, having received several deep wounds about the mouth and lips. As soon as their prize had settled to the bottom, the three Killers descended, bringing up large pieces of flesh in their mouths, which they devoured after coming to the surface. While gorging themselves in this wise, the old whale made her escape, leaving a track of gory water behind."

The swiftness of the Killer is very great, and to all small cetaceans this savage monster is a genuine terror. An eminent naturalist named D. F. Eschricht, who devoted much attention to the cetaceans, states that he knew one of these animals to capture and swallow alive, and in quick succession, four small porpoises, while from the stomach of another Killer, only sixteen feet long, were taken fourteen seals! In Bering Sea the Killer destroys large numbers of fur seals, and, when walruses were plentiful, even made war on them also. On the Atlantic coast it was, until recently, a common occurrence for a band of Killers to chase large schools of blackfish and porpoises into shallow water. They also persecuted the horse-mackerel, or tunny. The Killer is widely distributed, and his deeds of destruction have made him widely known and feared.

THE DOLPHIN.—Few persons cross the Atlantic, or make a voyage of half a dozen days in any direction, without seeing a school of dolphins. In fact, it might almost be said that every voyage has its dolphins. As a rule, they do not appear until passengers have recovered from sea-sickness, and are on deck, eagerly scanning the surface of the sea for living things.

To most voyagers, the sudden appearance of a school of dolphins is a thrilling sight. Hour after hour the eye scans the watery expanse, eager for a sign of life, or gazes with awe and fear into the dark, watery abyss below. Suddenly, out of the steep side of a green-topped wave leap forth a dozen shining, sharp-pointed forms. They seem joyous and full of power, like acrobats entering an arena. In sublime ignorance of man's rapacious nature, they confidently swim within twenty feet of the ship's side. They curve up to the surface, frequently leaping clear of the water, arch their bodies, breathe quickly, and dive again. For a few yards, perhaps, they race along under water, but in plain view, then some leap out again. How easily they keep pace with the ship! Their mastery of old Ocean is so complete that it is a wonderful thing to see.

Sometimes the animals are so near the ship that the species can be determined to a certainty, especially those which are marked by light colors. However, it is no disgrace to any naturalist to declare his inability to say positively what species is alongside.

Dolphins are particularly fond of playing around the bow of a ship; but for some reason best known to themselves,

they evince a decided preference for the out-thrusting bow of a sailing ship, and are not attracted so much by the high, perpendicular cutwater of a steamer, with no bowsprit or jib-boom.

A swift ocean steamship is not escorted very far, for such a promenade soon becomes tiresome; but I have seen a

Drawn by J. Carter Beard.

THE COMMON DOLPHIN.

school of these interesting creatures circle about a sailing ship and play around its cutwater for half an hour. It is a simple matter for an expert sailor to take a position on the martingale-guys of a ship, under the bowsprit, and harpoon a dolphin; but to me it has never seemed like a fair thing to do.

In North American waters there are about twelve species of dolphins, most of which are from 6 to 7 feet in length, and

but two or three species exceed 10 feet. The Short-Beaked Dolphin of the Pacific is the most beautiful species.

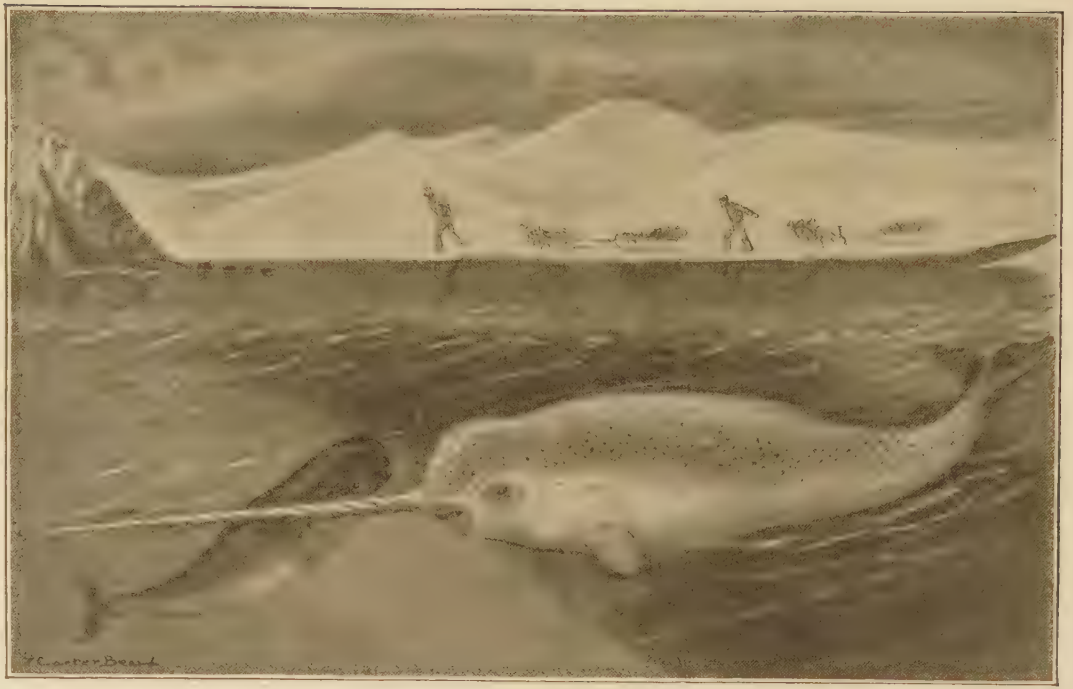
The Common Dolphin,[1] of the Atlantic Ocean, may well be taken as the type of the family of true dolphins. It is the species that is most frequently seen and the one that has been longest known. It has a slender, cigar-shaped body, a small head, and its beak is long and narrow. Its length is from 6½ to 7½ feet, and in color it is dark gray above and dull white below. Dolphins generally feed upon small fish, and at times destroy great numbers of mackerel.

The Common Porpoise,[2] of the Atlantic coast, is a jet-black creature, blunt-headed, heavy in action, a veritable pig of the sea. It loves to roll about in the breakers, and loaf lazily in harbors and sheltered bays and at river mouths. As before stated of porpoises generally, this animal does not leap from the water, in sheer enjoyment of a "life on the ocean wave," but heaves itself to the surface just high enough to bring its blow-hole out of the water, gives a loud puff or snuff, and then rolls heavily below.

This porpoise is the species most frequently seen by summer visitors on the Atlantic coast, and in various localities it is variously named. It is known as the Herring Hog, Snuffling Pig, Puffer and Snuffer. Its length seldom exceeds 4 feet 6 inches. It feeds upon fish, particularly on species like the herring and menhaden, which run in schools, and is said to be very destructive. Its flesh is very dark, its blood is almost black, and on the dissecting table it reeks of oil.

[1] *Del-phi'nus del'phis.*

[2] *Pho-cae'na com-mu'nis.*



THE NARWHAL, ADULT AND YOUNG.

One of the strangest of all cetaceans is the NAR'WHAL,[1] a creature 16 feet long, mottled black and gray, with a blunt-ended head, no back fin, and with a very long, straight tusk of ivory projecting straight forward from its head. This ivory tusk, which is from 6 to 8 feet long, is twisted throughout its length, from left to right, and is developed only in the male.

The Narwhal's teeth, aside from a few that are merely rudimentary, are reduced to a single pair, lying horizontally in the upper jaw. In the female they remain permanently concealed. In the male the right tooth usually remains similarly concealed, but the left is enormously developed into the tusk just mentioned. Having no other teeth, the creature is obliged to feed upon squids, jelly-fish generally, and small fishes that can be swallowed whole. It is found in the polar waters of the North Atlantic, and the Arctic Ocean north of the Old World, but is now rare in accessible waters. When Nansen and Johansen were retreating southward over the ice, after their dash toward the pole, each man with three dogs dragging a sledge with a kyak upon it, the first living creature actually observed by them was the Narwhal, in the lanes of water then rapidly forming in the great ice-pack, in Latitude 83° 36′.

[1] *Mon'o-don mon-o'ce-ros.*

CHAPTER XII

ORDER OF SEA-COWS

SIRENIA

IN certain warm and deep rivers of the tropics and subtropics, where water plants grow abundantly and all nature seems at peace, there live certain species of water mammals of strange form and habits. The manatees and dugongs differ so widely from even their nearest relatives in other Orders that it is not an easy matter to introduce them.

The body of a Sirenian is like that of a long-bodied seal. The neck is very large, but extends straight forward, and terminates in a small, blunt-ended head with very small eyes and lips so extensible and mobile in the manipulation of food that the artist who tries to draw their moods and tenses soon finds himself quite bewildered. There are no incisor or canine teeth, and the serrated molars are intended only for the bruising and cutting of tender plants.

There are front flippers of good dimensions, but they are well-nigh useless, and are about as shapely and graceful as a pair of old shoes. Apparently they are made for use in gesturing rather than in work, for when the animal rests upon the ground, the flippers break squarely at two joints and are folded under the body, backs downward! There are times, however, when the flippers are of some use in feeding, in

holding food and conveying it to the mouth. Instead of hind legs, there is a broad, flat tail, nearly as wide as the body of the animal at its widest point. The skin, which is about one inch in thickness, is almost as naked as that of an elephant. When twisted and dried, strips of it make practicable canes. The flesh is well-flavored and is eaten with relish.

Usually the Sirenians live in the lower reaches of rivers that flow into the sea, sometimes in water that is bitterly salt, frequently in brackish water, but in most cases quite above tidal influence, where the water is fresh and sweet. They never live in shallow water, preferring as a rule a depth of about fifteen feet. So far as we know, only one species of the Order has ever inhabited a land of ice and snow. The divisions of the Order are as follows:

THE ORDER OF SIRENIANS

Order Sirenia

FAMILIES	SPECIES	
MANATEES, *Triche'chidae*....	*Trichechus latirostris*...	Florida, Central America, Mexico, Cuba.
	Trichechus americanus .	South America to the Amazon.
	Trichechus senegalensis .	West Africa.
DUGONGS, *Dugong'idae*.....	*Dugong dugon*.....	Africa, Ceylon, India.
	Dugong australis.....	Australia.
RHYTINA, *Hy-dro-dam-al'i-dae*.....	*Hydrodamalis (or Rhytina) gigas*.....	Bering Island (*now extinct*).

THE MANATEE, or SEA-COW, will not often be seen outside of museums, but it must be introduced here in order that the readers of this book never need ask, as do thousands of other persons—"What *is* a Manatee?"

This creature, the only American representative of its Order except the extinct Steller sea-cow, is a large and heavy water mammal, from 9 to 13 feet in length, and in form very much like a seal. It has a blunt muzzle, small eyes, and rather feeble, clumsy front flippers. Its tail is a rounded disk, which in swimming forms a powerful propeller. When dry its skin is of a clean, slaty-gray color, but in the water it seems almost black. The bones are solid and heavy, and the ribs are very thick. The largest specimen ever taken and preserved in the United States was 13 feet in length, and must have weighed about 1,200 pounds. In the summer of 1903, a fine specimen about eight feet long was captured under a state permit in the Banana River, Florida, and placed on exhibition in the New York Aquarium. From time to time others have been exhibited at various watering-places along the Atlantic coast.

The Manatee never comes upon land. Usually its home is chosen in the upper waters of some deep, quiet tropical river, above the influence of the tide, where there is an abundance of Manatee grass and other water plants acceptable to it for food. It is herbivorous, and because its molar teeth are weak and it has no front teeth, it is compelled to live upon aquatic plants which are tender as well as nourishing. Its food is always eaten under water, and when at home its presence is generally revealed by the bits of plant stems and grass blades which escape and float to the surface. In captivity, the Manatee feeds upon lettuce, cabbage, canna leaves, celery tops, water-cress, spinach, eel-grass and ocean sea-weed.

THE MANATEE (*Trichechus latirostris*).
Drawn by J. Carter Beard from a living specimen in the New York Aquarium.

Even to-day the Manatee is found in Florida, in the Banana, Sebastian, St. Lucie Rivers, and also on the west coast of Florida, from Marco Island down to Cape Sable. Its wanton destruction is prohibited by state laws, under penalty of $500 fine. Occasionally, however, a specimen is netted alive, under a state permit, for exhibition purposes. Two of the great cold waves of the past ten years unfortunately killed several individuals in the Sebastian River. Farther south it is found about the Isle of Pines, Cuba and along the east coast of Mexico and Central America, while another species occurs in South America as far down as southern Brazil. The flesh of this animal is light-colored and both looks and tastes like lean fresh pork.

As the result of several years of inquiry, I am convinced that, strange as it may appear, in Florida the Manatee really is being perpetuated. The sentiment in favor of its preservation is almost universal, and there is ground for the belief that this is largely due to the wise liberality of the state authorities in granting a reasonable number of permits to capture specimens alive when the animals are ordered at high prices for public exhibition. I believe that there are more Manatee alive in Florida to-day than there were twenty years ago, even though at one time the species seemed doomed to speedy extinction in the state.

THE DUGONG is the only living Old-World representative of the Order Sirenia, and between it and the manatee the chief difference is found in the whale-like tail of the former. The Australian Dugong, which attains a length of 14 feet, once was so abundant along the coast of Queensland,

between Moreton Bay and Cape York, that a regular fishery was established at Moreton Bay.

The Rhytina, or Arctic Sea-Cow, is of special interest to Americans because of the important part it played about the middle of the eighteenth century in the discovery of Alaska. In 1741 the Russian navigator, Captain Vitus Bering, was shipwrecked on Bering Island and compelled to winter there. The majority of the crew of the *St. Peter* died of hardship, and the remainder also would have perished but for the presence of the great Arctic Sea-Cow, then seen for the first time. To George William Steller, the official naturalist of the ill-fated expedition, the world owes all it ever will know of the life history of this animal. Despite the sufferings he endured, he faithfully and laboriously reduced to writing everything that he observed of the ponderous animal whose flesh sustained the lives of the castaways.

The Rhytina was an animal closely resembling the dugong and manatee, but greatly exceeding the maximum size of either. Steller declared that "the full-grown animal weighs about 8,000 pounds," and from the skeletons that were collected on Bering Island in 1883 by Dr. Leonhard Stejneger, and now on exhibition in the United States National Museum, we know that full-grown animals attained a length of between 20 and 30 feet.

This species was exterminated by whalers who sought it for food, aided by the natives who used both its flesh and skin. It was practically exterminated about 1780, but the last animal was not killed until 1854. (Nordenskiold's "Voyage of the *Vega*.")

CHAPTER XIII

ORDER OF TOOTHLESS MAMMALS

EDENTATA

NEAR the bottom of the scale of terrestrial warm-blooded quadrupeds, is found the Order Edentata, so called because several of its members are toothless, and others are nearly so. It contains perhaps a greater proportion of odd and remarkable forms than any other Order, and all are found on the American continent. Many of them are so wonderful in form and habit that they well repay the effort necessary to make their acquaintance. The species fall into three Families, as follows:

ORDER EDENTATA

FAMILIES		EXAMPLES
ARMADILLOS	*Das-y-pod'i-dae*	Nine-Banded Armadillo. Six-Banded Armadillo. Three-Banded Armadillo. Giant Armadillo.
ANT-EATERS	*Myr-me-co-phag'i-dae*	Great Ant-Eater. Tamandua.
SLOTHS	*Brad-y-pod'i-dae*	Three-Toed Sloth. Two-Toed Sloth.

THE ARMADILLO FAMILY

Dasypodidae

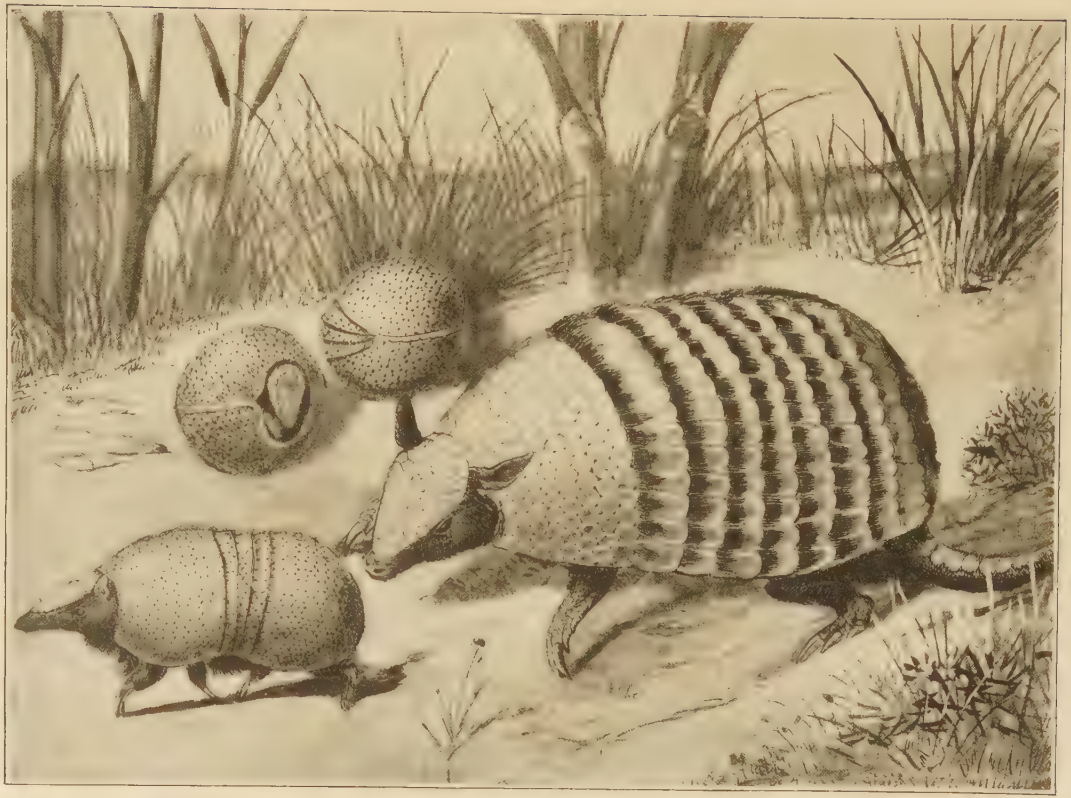
With a few exceptions, armadillos are found only in South America. The southern half of that continent was once the

home of a wonderful array of gigantic animals belonging to this Order. In the La Plata Museum of Natural History is a procession from the Past. It is a long row of earth-colored, dome-like shells of great thickness, some of them as large as small hogsheads, and curiously ornamented by a scalloped lower edge. Some are provided with huge tails that are studded with many big, pointed knobs, called tubercles. These curious objects are the remains of gigantic armadillos, now extinct, called Glyp'to-dons, which once roamed over the pampas of South America.[1] In many American museums casts of the remains of one of these weird creatures may be seen in what is known as the "Ward Casts of Fossils." The shell of the Glyptodon copied in plaster by Professor Ward is a nearly perfect dome, 5½ feet long, 4 feet wide and 40 inches high.

With but one exception, the armadillo of to-day is a small creature, finding shelter in burrows which it digs for itself in the earth. Its movements are nervous and spasmodic, and for a short distance it scurries over the ground quite rapidly, running on the ends of its claws, and dodging quite skilfully. Its legs are so short, however, it cannot run far, and when about to be overtaken by a dangerous enemy, it halts and burrows in the ground with wonderful rapidity. It is not equipped for fighting, for it has no front teeth. Its claws are fit only for digging, and since it cannot climb trees, it prefers to live in burrows, on open prairies.

But Nature has not left these creatures without protec-

[1] A large Glyptodon, 7 feet long, has recently been discovered in Texas, and described by Professor H. F. Osborn as *Glyptotherium texanum*.



THE THREE-BANDED ARMADILLO (1–3), AND SIX-BANDED ARMADILLO[1] (4).

Figures 1–3 represent half-grown specimens.

[1] *Tol-y-peu'tes sex-cinc'tus.*

tion from their numerous enemies. The body is incased in a hard shell, composed of small plates of bone very cunningly joined together, which covers every portion save the breast and abdomen.

The head is protected by a plate placed on its upper surface, and the tail is incased in a chain of bony rings. When attacked by a savage animal, the armadillo tucks its legs under the edge of the shell alongside its body, rolls into a ball, and as nearly as possible leaves nothing exposed save its shell. The creature thus becomes a living nut, that is not to be cracked and eaten by every enemy that comes along.

If the shell is strong enough, the armadillo is safe; but if it is not strong and hard, or entirely perfect as an envelope, a jaguar or puma may possibly kill the animal and devour it.

The armadillos with the weakest armor have found it wise to avoid the forest home of the jaguar and puma, and live on the open plains, where they are less liable to be killed. To enable them to do this, Nature has provided them with long and powerful front claws, with which to dig burrows in the hardest soil.

It was in Argentina that the great armadillos of the past reached their highest point in size and abundance. Thence smaller species ranged northward, until in southern Texas and Arizona we find the northern limit of the group, and the only species found in the United States. There are three species of armadillos that from time to time appear, alive, in zoological parks, the nine-banded, six-banded and three-banded. The largest species now living is so rare it is very

seldom seen in captivity. It is the giant armadillo of northeastern South America.

The Three-Banded Armadillo,[1] of Argentina, represents the highest degree of perfection attained, either past or present, by any member of the Family.

Its shell is very strong, and so perfect is its mechanism that when the animal is in danger, it makes of itself a round ball, so completely incased in horn that no four-footed enemy can penetrate it. Even the top of the head is protected by a shield, which acts as a shutter when the animal rolls up and wishes to close the only opening leading into the shell. It gives one a very queer sensation to handle one of these living nuts, and note the marvellous ingenuity in design and skill in mechanical execution which has been displayed in providing this special means of protection for an otherwise defenceless creature.

Having such excellent defensive armor, the Three-Banded Armadillo does not often burrow in the ground, and it ranges freely by daylight. In running it touches only the ends of its claws to the ground, and the shell is held high. The head-and-body length of the adult animal is about 14 inches, and the tail measures 3½ inches.

The Nine-Banded Armadillo[2] ranges all the way from southern Texas and Arizona to Paraguay, and along the Rio Grande is so common that living specimens are sold at $2 each. In Venezuela I found it burrowing on the open savannas, going down about four feet, in a hole seven inches in diameter. The flesh of this creature is well flavored and

[1] *Das'y-pus tri-cinc'tus.* [2] *Ta'tu no'vem-cinc'tum.*

is generally esteemed as palatable food. Being in a state of perpetual hunger, we found armadillo stew very much to our taste. The Nine-Banded Armadillo has a total length, from nose to end of tail, of about 26 inches, and in bulk is about the size of our opossum. In captivity its food is milk, boiled eggs and chopped meat, but in a wild state it feeds upon a mixed diet of worms, ants, snails, beetles, small lizards, grasshoppers and other insects. The young in a litter vary from six to ten.

THE FAMILY OF ANT-EATERS

Myrmecophagidae

The ant-eaters form another Family of Edentates, also confined to South and Central America, and all its members are absolutely toothless. The most celebrated member of the group is the GREAT ANT-EATER.[1] Although it is very unlike a bear, it is sometimes called the ANT-"BEAR"; and when once seen it is never forgotten. The most peculiar thing about it is the extraordinary length of its head, which in front of the eyes is prolonged into a slender beak, with the mouth and nostrils situated at its tip end. The opening of the mouth is just large enough to admit the blunt end of a lead pencil.

The feature which comes next in oddity is the big, fleshy tail, covered with an enormous brush of coarse, wavy hair. The popular belief in South America that the Ant-Eater sweeps up ants with its tail in order to devour them in a wholesale way, is quite erroneous, for the tail serves a very

[1] *Myr-me-coph'a-ga ju-ba'ta.*

different purpose. Its use is to cover the owner when asleep. When the animal lies down to sleep, the tail is flung over the body, and the long, wavy hair forms a thatch so thick that no other portion of the creature is visible. It looks like a pile of brown hay. A medium-sized specimen that lived for about a year in the New York Zoological Park measured 12 inches in length of head; the neck and body, 31 inches; and tail vertebrae, 26 inches.

In its wild state the Ant-Eater feeds upon ants, which it devours in great quantities. In fact, Nature has provided this Family of animals in order to restrict the number of plague-like ants which, even with Ant-Eaters in the forests, are entirely too numerous. Its long and powerful front claws are very useful in tearing open ant-hills, and dissecting decayed logs, but as a means of defence they are quite inadequate. Neither are they well formed to walk upon. The tongue is very long and slender, and can be thrust out 9 inches; but, contrary to innumerable misstatements, it is as clean and smooth as the tongue of a dog, and is *not* coated with sticky saliva, or anything like it.

This animal is very clumsy on its feet, and being defenceless, unable to climb and too large to live in a burrow, it is a wonder that all the Great Ant-Eaters were not killed and devoured long ago, by jaguars and pumas. Although quite rare, even in South America, a goodly number of specimens find their way into captivity. Until settled down sensibly to a diet of chopped meat, milk and eggs, they are difficult to keep alive. One specimen persistently refused to eat ants.

THE GREAT ANT-EATER (LOWER FIGURES) AND THE TAMANDUA (UPPER FIGURE).

THE TAMANDUA[1] is a smaller Ant-Eater than the preceding species, of tree-climbing habits, with a proportionately shorter head, no long hair on its tail, and extremely large front claws. It is found in Venezuela, the Guianas, Brazil, and in fact the greater portion of the region of tropical forests on this continent south of Mexico. Its tail is prehensile, or grasping, and in climbing is used almost constantly. One of these creatures which I once kept in South America as a camp pet, became very friendly, and even affectionate, and when permitted would climb all over me, as if I were a new and very soft species of tree. In the accompanying picture the Tamandua is represented by the small central figure. Its head-and-body length is about 24 inches; tail, 18 inches.

THE SLOTH FAMILY

Bradypodidae

The sloths inhabit the New World only; and the so-called "sloth" of Ceylon is not a sloth, but a slow lemur. All the real sloths belong to the Order of Edentates, and inhabit the tropical forests of Central and South America, from Costa Rica southward. The sloths are not really toothless, for they have five pairs of teeth in the upper jaw, and four in the lower.

One cannot look at a live sloth without thinking that Nature has but poorly equipped this animal to live in this murderous world. Its countenance is a picture of complete and far-reaching stupidity, its bodily form the acme of four-footed helplessness. It can neither fight, hide nor run away.

[1] *Tam-an'du-a tet-ra-dac'ty-la.*

It has no defensive armor, not even spines. It is too large to live in a hole in a tree and too weak to dig a burrow in the earth. It is too tired to walk on its feet, as the monkeys do, so throughout its queer life it hangs underneath the branches of the trees in which it finds its food. Its feet are merely four hooks by which to hang. Since it feeds wholly upon leaves and buds, it lives in the tropical forests, where green leaves are plentiful and cheap.

The sloth dwells only in the tree-tops, among the monkeys and macaws. On the ground, it would be more helpless than a tortoise, and easily killed by any carnivore, or wild pig. In the tree-tops, it escapes the climbing ocelot by living far out on the ends of the branches; and it is fortunate for him that hawks, owls and eagles are scarce in the forests wherein he dwells.

At this point, however, it is a pleasure to point out that Nature has done one special thing for the preservation of these odd creatures. The hair of a sloth is long, wavy and coarse, rather more like grass than hair, and in color and general appearance it is the best imitation of tree-bark that has been given to any quadruped. This resemblance to bark is heightened by the fact that the back hair of many a sloth in its native forest has a greenish tint, like moss on a tree-trunk, due to the presence on the hair of living vegetable algae. This aids the sloth in escaping observation.

On the mighty Essequibo River, in British Guiana, I once made a special hunt for sloths. Having found it useless to hunt them by stalking through the dense and lofty forests, I took a leaky old canoe, an Indian to help furnish power, and

paddled fifteen miles and back. We followed the shores, going and coming, and secured eight specimens of the THREE-TOED SLOTH,[1] the one with a brown saddle-mark of short hair in the middle of its back.

We found them in the tops of low trees at the water's edge, spread-eagled on the outer branches, or hanging upside

Sanborn, Photo., N. Y. Zoological Park.

TWO-TOED SLOTH.

down, but always eating leaves. They did not know what it was to "take alarm," and try to escape. Judging by the awful deliberation of those that we saw in motion, I estimated that a really swift sloth could travel half a mile in twenty-four hours, if not side-tracked.

[1] *Brad'y-pus tri-dac'ty-lus.*

We shot some of our specimens, and others we took alive by cutting down their trees. One tree fell with its top in the river, and the sloth was carried four feet under water. But even the prospect of drowning did not make him hurry to the surface. To my amazement, he climbed up through the branches, slowly and deliberately, until at last, with dignity entirely unruffled, he appeared above the surface, and looked at me with a most disgusted expression on his wooden countenance.

Sloths eat so slowly that before one meal is over it is time for the next, so that their meals overlap one another.

The Three-Toed Sloth is not found above the Isthmus of Panama, but two other species inhabit Central America as far north as Nicaragua. It is considerably smaller than the next species, having a head-and-body length of 21 inches, while the spread of its outstretched arms, exclusive of the claws, is 32½ inches. The tail is so very short that it seems to be wanting entirely, but in reality its length is 1½ inches.

The Two-Toed Sloth,[1] also called Hoffman's Sloth, ranges northward as far as Costa Rica. It is the largest living member of the Sloth Family, and its appearance is well shown in the accompanying picture of a specimen kept in the Zoological Park. It inhabits the same regions as the preceding species, but is less common. It is occasionally seen alive in large zoological gardens, and when once properly acclimated, lives in captivity very well. Usually, however, it is difficult to keep alive. In captivity its food is chopped carrots, cabbage, lettuce and boiled rice. A Sloth usually

[1] *Cho-loe'pus hoff'man-i.*

sleeps suspended from a branch, but at the same time it always seeks a position in which it can rest its body on a branch below parallel with the one to which it clings.

In prehistoric times a Family of gigantic ground sloths, called MEG-A-THE'RI-UMS, creatures as large as the largest rhinoceros, lived on the pampas of southern South America and also in the southern United States. Plaster casts of the entire skeleton of the most celebrated species (*Megatherium cuvieri*), from South America, 17 feet 9 inches long, are now to be found in many American museums.

CHAPTER XIV

ORDER OF DIGGERS

EFFODIENTIA

THIS Order contains only a very small number of genera and species, all of which are confined to the Old World. They are the pangolins of Africa and the Far East, and the aard-varks of Africa. Until very recently these animals have been classed with the ant-eaters, sloths and armadillos, in the Order Edentata, or toothless mammals. But both in internal and external anatomy they differ widely from their very distant American relatives.

The latest and most exact classification assigns them to a new and wholly independent Order, called Ef-fo-di-en'tia, which means "Diggers." Its divisions are as below:

ORDER EFFODIENTIA

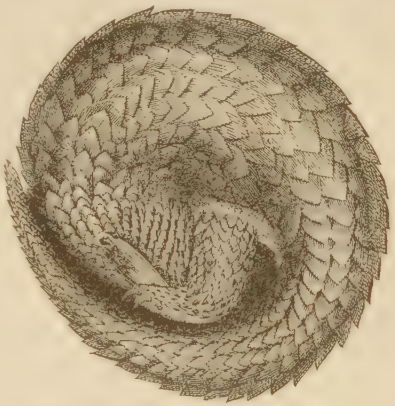
FAMILIES		EXAMPLES
PANGOLINS	*Man'i-dae*	Manis, or Pangolin, of India. *Manis pentadactyla.*
AARD-VARKS	*O-ryc-te-ro-pod'i-dae*	Aard-Vark, of South Africa. *Orycteropus a'fer.*

THE PANGOLIN FAMILY

Manidae

One good look at a pangolin, or manis, is enough to arouse curiosity and provoke inquiry. Like the armadillo, it is one

of the wonders of the living world,—absolutely toothless, dwelling upon the earth, surrounded by savage and merciless enemies, but safe in the protection of a complete suit of plate armor and of powerful claws for digging. There are about seven species in this Family, scattered all the way from China and Borneo to South Africa, excepting the break in the chain caused by the deserts of North Africa and Arabia. Of the three African species, two are distinguished by the extreme length of their tails, and one by its great size, six feet in length, which entitles it to the name GIANT PANGOLIN.



AN INDIAN PANGOLIN, ROLLED UP.

THE INDIAN PANGOLIN, or MANIS,[1] of Ceylon and India, generally in the lowland forests, may be chosen as the representative of this Family. My first feeling toward it is that of friendship and gratitude, for in the jungles of Ceylon a living specimen once furnished me entertainment, anxiety and sustenance.

My first Manis was brought by a native, who carried it in a bag over thirty-five hot and dusty miles. While in transit on man-back, the animal kept himself comfortably coiled, but when set free upon the ground he promptly uncoiled and stood up for inspection. He was 36 inches long, including the tail, which measured 17 inches, and his weight was 18 pounds.

[1] *Man'is pent-a-dac'ty-la.*

From the tip of his nose to the end of his tail, he was covered with broad, flattened shield-shaped plates, or scales, of clear, gray horn.[1] Those plates, which were concave underneath and convex above, lay close down upon the skin and upon each other, and were arranged in rows or courses, perfectly imbricated (*i. e.*, joint-breaking) like the scales of a big fish, or a hawk's-bill turtle. We presently discovered that they were fully controlled by the voluntary muscles of the skin. The tail was very broad, measuring 5½ inches across where it joined the body, slightly hollowed underneath and rounded on the top. It was a most useful appendage, and its special function was to protect the head.

In walking, the Manis carried his back very highly arched in the middle. The long and powerful front claws were bent under the feet, until they pointed directly backward, and were literally walked upon. The heavy tail barely cleared the ground and the nose was always carried low, as if slyly searching for something. Often the creature stood erect on its hind legs, like a kangaroo, especially when looking about for insect food; and as it walked its armor clanked like that of an ancient mail-clad knight.

Whenever he found a colony of ants, he would begin to dig most industriously. After digging a short distance into an ant-hill and exposing the interior, he would thrust his long and slender tongue into the passage-ways and draw it out thickly covered with ants.

To me the most wonderful thing about the animal was its means of protection from its enemies, for it cannot truth-

[1] Museum specimens are usually of a yellowish-brown color.

fully be called defence. Without some very special provision of Nature, a slow-moving, toothless and hornless terrestrial animal would fare badly in jungles inhabited by leopards, tigers, wolves, jackals and wild swine.

When I first endeavored to become acquainted with my Manis, he immediately tucked his head down between his four legs, brought his tail under his body and up over his head and held it there closely, thus forming of himself a flattened ball completely covered with scale armor. When I undertook to uncoil him, I could not manage it alone, and called a servant to help me; but the tail clung to the body as tightly as if it had been riveted there. Then I called another man, and while I held the body, the other two pulled on the tail with all their strength, to uncoil it. But in vain. We wrestled with that small animal until we were fairly exhausted, and so great was the power of the tail that we gave up beaten.

From the very first, I had no end of trouble with my scaly pet. I could not tie him, for on no part of his body or limbs would a rope hold ten minutes without hurting him. During the day he was reasonably quiet, but at night he was very restless, and anxious to go out ant-hunting. For the first night I shut him up in the main room of the Rest House; and in the morning I found him fully ready to break through a hole he had dug with his big front claws in the ten-inch wall of solid masonry. Well may naturalists assign the Pangolins to the independent Order of Diggers!

The next night I placed the Pangolin in a large tin box, well covered with boards. At three o'clock in the morning the village dogs raised such a row at the edge of the jungle

that my servant went to them to investigate; and it was that animal. It had torn a hole in one corner of its tin prison, and escaped; and, but for the very dogs that had so often annoyed me by trying to steal my specimens, it would have been lost to me forever.

THE AARD-VARK FAMILY

This Family contains but one genus and two species, the CAPE AARD-VARK,[1] of South Africa, and the ETHIOPIAN AARD-VARK, of East Central Africa.

With their usual facility in misnaming wild animals, the Boer pioneers in Cape Colony bestowed upon the species found there the name Earth-"Pig," and it has become a fixture.

The Cape Aard-Vark is as much like a pig as it is like a jack "rabbit," but no more. Cut off its extremely long and rabbit-like ears, cover it with imbricated scales to fit its body, and externally we should have a rather tall pangolin, about 5 feet long. Unlike the pangolins, the jaws are provided with teeth. The tail is long, thick and heavy, and its special use is not quite apparent.

In the usually wise economy of Nature, these insect-eating animals were developed in Africa for the special purpose of checking the ants of that region. Their powerful front claws enable them to dig with great success into the tall and also numerous ant-hills of Africa, and before the days of universal game destruction, the Aard-Vark was oftenest found where ant-hills were most numerous.

[1] *O-ryc-ter'o-pus a'fer.*

CHAPTER XV

ORDER OF POUCHED MAMMALS

MARSUPIALIA

AN animal is said to be "low" in zoological rank according to the distance of its position below the highest types of animal life. Thus, a hairless, fish-like mammal, with very simple teeth, like a porpoise, is far lower than the monkeys and carnivores.

As we approach the Orders of mammals which we have been taught to place at the end of the list, we encounter some very strange forms, which are of greater interest to the special student than some higher forms which are duplicated many times over. Fortunately for our purpose, all the Orders of living mammals, save two, are represented in North America.

Although the Order Marsupialia is too extensive, and the majority of its members too far away, to justify its full exposition here, it is desirable to mention all its Families:

ORDER MARSUPIALIA

FAMILIES		HABITAT
KANGAROOS	*Ma-cro-pod'i-dae*	Australia, New Guinea, Aru Is.
PHALANGERS	*Phal-an-ger'i-dae*	Australia.
WOMBATS	*Phas-co-lo-my'dae*	S. Australia.
CAENOLESTES	*E-pan-or'thi-dae*	South America.
BANDICOOTS	*Per-a-mel'i-dae*	Australia and New Guinea.
DASYURES AND TASMANIAN WOLVES	*Das-y-u'ri-dae*	Australia.
OPOSSUMS	*Di-del-phy'i-dae*	North, Central and South America.
MARSUPIAL MOLES	*No-to-ryc'ti-dae*	Australia.

Of these eight Families, only two, the first and seventh, will be specially noticed.

Marsupials are distinguished from all other mammals by the fact that the female possesses in the skin of her abdomen a large, flexible pocket, or pouch, in which the nursing glands are situated, and in which the young are carried for a time after birth, until more fully developed. They differ from ordinary mammals in being without what is called a *pla-cen'ta*, which is an arrangement of veins by which the blood of the mother circulates through the veins of the unborn young. In other words, in a marsupial, the blood of the mother does *not* circulate through the veins of the unborn young. As a result, at the time of its birth, the young marsupial is a tiny creature, hairless, blind and utterly helpless. Even the young of a large kangaroo looks more like a little lump of jelly than a highly organized living creature. One which I saw in the London Zoological Gardens was less than an inch in length, and no thicker than a lead-pencil.

The newly born young is taken by the mother, in her front paws, and placed in her pouch; and the half-formed creature, with a mouth specially formed for suction, attaches itself to the nursing gland, and so remains for many days, or even weeks. Slowly it grows, until it develops hair, and its eyes open. At length it becomes large enough so that it ventures to stick its little head out and view the world. By and by it climbs out to take exercise, but jumps back again at the first alarm. In an animal which travels as far each day as the kangaroo, a pouch for the conveyance of the young is a great convenience.

THE KANGAROO FAMILY

Macropodidae

In Australia, the land of queer things, nearly all the land mammals are marsupials. The Order includes the kangaroos, large and small; wombat, Tasmanian wolf, Tasmanian devil, koala and many others. All kangaroos come either from Australia, Tasmania or New Guinea, but one group of small wallabies extends its range to New Britain and the Aru Islands. The great majority of these creatures dwell on the ground in the open plains, or in the "bush" of Australia. In northern Queensland and New Guinea are four species of Tree Kangaroos, which actually climb trees and inhabit them.

The largest species is the great GRAY KANGAROO,[1] also called "*Old man*" and "*Boomer*," which stands over 4 feet high, weighs nearly 200 pounds, and when frightened can leap twenty feet or more. The smallest species are the RAT KANGAROOS, some of which are but 14 inches high. Despite their nocturnal habits specimens are frequently seen in captivity. One of the handsomest of all the species is the RED KANGAROO,[2] a creature about 4 feet high, frequently seen in captivity, and quickly recognized by its brick-red color and fine, silky hair. Several small species of Kangaroos are called WAL'LABIES, and the species figured herewith is a good representative of this whole Family.

The Kangaroo is a strange variation in form from the ordinary terrestrial mammal. Its extremely long, strong hind legs and massive tail, also of great length, form a wonderful

[1] *Mac-ro'pus gi-gan'te-us.* [2] *Macropus ru'fus.*

jumping machine. The tail not only assists the animal in leaping, but it also serves as a balancing pole, and keeps its

BRUSH-TAILED ROCK WALLABY (*Petrogale penicillata*).
Length, head and body, 28 inches; tail, 24 inches.

owner from losing his proper position when in mid-air. It is reasonably certain that a Kangaroo without a tail would when leaping frequently overbalance and turn somersaults. Kangaroos were once very abundant in Australia, but the

general settlement of that country and the systematic killing of the animals for their skins, which are used as leather for shoes, have so greatly reduced the number that now one must go far inland in order to find them wild.

Few persons, I venture to say, have the slightest conception of the number of Kangaroo and Wallaby skins annually consumed by the leather trade for shoe uppers, as they are soft and not given to cracking. One firm in New York handles about 72,000 per year. In 1911 and 1912 C. M. Lampson & Co. of London sold the following:

	1911	1912
Australian Wallaby Skins	1,003,820	540,608
Australian Kangaroo Skins	21,648	16,193
	1,025,468	556,801

Most pouched mammals are strictly herbivorous, but some, like the opossum and Tasmanian wolf, are true flesh-eaters.

THE OPOSSUM FAMILY

Didelphyidae

The New World contains more than twenty species of omnivorous animals, varying in size from a large cat to a small rat, mostly provided with long, hairless tails that are fully prehensile, and always well clad with fine and abundant hair. In all species save a few the female possesses the abdominal pouch to which every marsupial female is entitled. In some species, however, it is either rudimentary or wholly lacking. These animals are the Opossums, and while the majority of the species are confined to South America, our

North American representative is about as widely known as all the tropical species combined.

The Virginia Opossum[1] is a typical marsupial, but differs widely from all the Australian members of that Order.

VIRGINIA OPOSSUMS.

Seemingly it is a dull-witted, slow-moving creature, and so ill-fitted by Nature either to fight or to run away, that it might be considered almost defenceless. But let us see what use this odd little animal makes of the physical and mental equipment which Nature has given it.

It eats almost everything that can be chewed,—wild fruit, berries, green corn, insect larvae, eggs, young birds and quadrupeds, soft-shelled nuts and certain roots. It is a good climber, and has a very useful prehensile tail. It for-

[1] *Di-del'phis vir-gin-i-an'a.*

ages on the ground quite as successfully as a raccoon. Usually it burrows under the roots of a large tree, where it is impossible for a hunter to dig it out, but sometimes it makes the mistake of entering a hollow log. Like the bear and woodchuck, it stores up under its skin a plentiful supply of fat for winter use, when food is scarce and dear. Above all, the female has a nice, warm pouch in which to carry and protect her helpless young, instead of leaving them in the nest to catch their death of cold or to be eaten by some enemy.

The young of the Opossum vary in number from seven to eleven. Not until they are about five weeks old do they begin to venture away from the mother; and for a further period they are very careful not to get beyond grabbing distance of her shaggy coat.

The Opossum is a very hairy animal. Its under fur is woolly and white, and the outer coat is straight, coarse and tipped with black. The nose, lips and half the ear are pinkish white, and the eyes are like a pair of shoe-buttons. The tail is naked, white and strongly prehensile.

A large specimen has a head-and-body length of 15 inches, tail 12 inches, and the weight of a large specimen is 12 pounds. In the South the flesh of this animal is much prized as food, and I can testify that when properly roasted and served with nicely browned sweet potatoes and yellow corn bread, it is an excellent dish.

One habit of this animal is so remarkable and so widely known that it has passed into a proverb,—"playing 'Possum." When found by hunters, the Opossum deliberately feigns death, hoping to escape by being "left for dead." Give it a

tap on the head or back, and it stretches out, limp, motionless and seemingly quite dead. Its breath is so short and feeble the thick fur almost conceals the chest movement.

When but a lad I killed my first Opossum in an Indiana forest, and had carried it by the tail for half a mile when we came to a rail fence. In climbing through, I noticed that the front claws of my Opossum caught on a rail and held fast in a manner highly unbecoming in an animal that was honestly and sincerely dead. A close examination revealed the fact that my victim was only nominally dead. In other words, it was fully alive and sharply watching for a chance to escape. This discovery led me to keep the animal alive in confinement, until finally it did escape.

The Virginia Opossum is the species found in the United States, from New York to Florida, and westward through the southern states to Texas. In Mexico and tropical America several other species are found. Notwithstanding the persistent destruction of the Opossum, both for moonlight sport and for food, it still manages to survive throughout its entire original range, and bids fair to outlive the native American. The persistence with which the Opossum keeps up its numerical strength in the face of persecution is almost beyond belief. In 1911 C. M. Lampson & Co. of London handled 1,011,824 skins of our friend the Virginia Opossum.

As a pet, or cage animal, the Opossum shows off very poorly, and is rather uninteresting. In the daytime its sole desire is to curl up into a furry ball and sleep. If disturbed, it opens its pink mouth very widely, in silent protest, and as soon as

E. R. Sanborn, Photo., New York Zoological Park.

MURINE OPOSSUM AND YOUNG.

About one-half life size.

the trouble is over, again tucks its head under its body, out of sight, and sleeps on.

The Murine Opossum[1]—a name which means *Mouse-like Opossum*—is a South American species which is remarkable because of its diminutive size. The full-grown female specimen shown in the accompanying illustration, with a brood of seven hairless young clinging to the fur of her body, was about the size of an Eastern chipmunk. The abdominal pouch is wholly wanting in this species, and from birth the naked and almost helpless young must either cling to the fur of the mother or die. As they grow larger, they travel on the back of the mother, with their tendril-like tails clinging to her tail.

The specimen shown reached New York just as a score of others have before it,—hidden in the interior of a bunch of bananas!

[1] *Mar-mo'sa murina.*

CHAPTER XVI

ORDER OF EGG-LAYING MAMMALS

MONOTREMATA

"There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy."

THERE are two Families of mammals the members of which lay eggs, from which their young are hatched as are those of birds. They form the lowest order of mammals, and in one respect this group forms a good connecting link between mammals and birds:

ORDER MONOTREMATA

EGG-LAYERS

FAMILIES		EXAMPLES
DUCK-BILL	*Or-ni-tho-rhyn'chi-dae*	The Ornithorhynchus, or Duck-Bill.
ECHIDNAS	*Tach-y-glos'si-dae*	Five-Toed Echidna. Three-Toed Echidna.

THE PLATYPUS, or DUCK-BILL,[1] is found only in Australia, —a land of queer things. Not only is it bird-like in laying eggs, but it also possesses webbed feet, and a flat, duck-like bill, from which it derives one of its popular names. The beak is of black horn, and the food is crushed between the cross-ridge plates of the lower jaw and the roof of the mouth.

[1] *Or-ni-tho-rhyn'chus an-a-ti'nus.*

This animal is about as large as a prairie-"dog," and its body is similarly shaped; but there the resemblance ends abruptly. Its front feet are webbed quite beyond the ends of the toes, and in digging, the outer edge of the web is rolled back underneath the foot, to expose the claws. The hind

THE PLATYPUS, OR DUCK-BILL.

feet are webbed only to the base of the claws, and each is provided with a strong, sharp spur an inch long, which is said to be connected with a poison gland.

The tail is broad and flattened, well haired on the upper side and almost naked below. The hair of the Platypus is dark brown in color. The outer coat is stiff and harsh outside, but the inner is fine and soft. The length of head and body is 13 inches; tail, 5 inches.

The habits of the Duck-Bill are very similar to those of our old friend the muskrat. It inhabits quiet but deep pools of fresh water, burrows deeply into the banks and is seldom seen save at nightfall. In its burrow it builds a nest for its

young, and deposits two eggs, which are enclosed in a strong, flexible shell three-fourths of an inch in length by two-thirds of an inch in greatest diameter. When first hatched the young are blind and hairless, and the beak is very short.

AN ECHIDNA IN THE NEW YORK ZOOLOGICAL PARK.

The food of this creature consists of aquatic insects, crustaceans and worms.

The other Family of egg-laying mammals belonging to this Order contains the ECHIDNAS of Australia and New Guinea. These animals are arranged in two genera, the Five-Toed Echidna (*Tachyglossus*), consisting of a single species which occurs in Australia, Tasmania and New Guinea, and the Three-Toed Echidnas (*Zaglossus*), comprising two species, which are confined to New Guinea. The Five-Toed Echidna is covered with strong spines set very thickly all over its outer surface, and its nose is a slender and narrow beak.

CHAPTER XVII

THE PRESENT AND FUTURE OF THE LARGE AMERICAN MAMMALS

DURING the past five years the question of the effective preservation or the practical extermination of the best wild life of North America has become thoroughly acute. Ever since 1904 the saving of our big game and our birds has completely overshadowed the academic study of those species. Thoughtful and conscientious men and women have acknowledged that it is wrong to spend all time and all efforts in studying the anatomy, habits and classification of our birds and mammals in utter indifference to the fact that those very forms are being exterminated. In a professional zoologist, no matter whether his habitat be America, Europe, Asia or Africa, indifference to the proper protection of wild life quickly becomes a crime; and any zoologist who now remains deaf to the distress calls of perishing species is unworthy of his profession, and deserves to be compelled to work for a living. A number of "bird men" and "mammal men" have awakened to a realizing sense of their obligations to living things and are hard at work "on the firing-line," endeavoring to save the remnant.

At this time, with the large mammals of North America trembling on the brink of annihilation, no chapters in this work can surpass in importance those which attempt to set forth understandingly the prospects of our so-called "big-game" animals. It is necessary that every person who is interested in our mammalian fauna should know exactly where we stand to-day and what the outlook is for the near future.

The subject of this chapter opens up a vast field of facts and conclusions, quite broad enough to fill a whole volume. In the space at our disposal here it is possible to offer only a summary of the subject, without attempting to prove our statements by the production of detailed evidence.

To say that all over the world the large land mammals are being destroyed more rapidly than they are breeding, would not be literally true, for the reason that there are yet many areas that are almost untouched by the destroying hand of civilized man. It is true, however, that all the unspoiled areas are rapidly growing fewer and smaller. It is also true that in all the regions of the earth that are easily penetrable by civilized man, the wild life is being killed faster than it breeds, and of necessity it is disappearing. This is why the British are now so urgently bestirring themselves to create game preserves in all the countries of their domain.

It is one of the inexorable laws of Nature, to which I know of not one exception, that large hoofed animals which live on open plains, on open mountains or in regions that are thinly forested, are always easily found and easily exterminated. All such animals have a weak hold on life. This is because it

is so difficult for them to hide and so very easy for man to creep up within the killing range of modern, high-power, long-range rifles. Is it not pitiful to think of animals like the caribou, moose, white sheep and bear trying to survive on the naked ridges and bald mountains of Yukon Territory and Alaska! With a modern rifle the greatest duffer on earth can creep up within killing distance of any of the big game of the North.

The gray wolf is practically the only large animal that is able to hide successfully and survive in the treeless regions of the North; but his room is always preferable to his company, because he, too, is a destroyer of big game.

I am tempted to try to map out roughly what are to-day the unopened and undestroyed wild haunts of big game in North America. In doing this, however, I warn the reader not to be deceived into thinking that because game still exists in those regions, those areas therefore constitute a permanent preserve and safe breeding-ground for large mammals. That is very, very far from being the case. The further "opening up" of the wilderness areas, as I shall call them for convenience, can and surely will quickly wipe out their big game; for throughout nine-tenths of those areas it holds to life by very slender threads.

UNOPENED WILDERNESS AREAS

To-day the unopened and undestroyed wilderness areas of North America, wherein large mammals still live in a normal wild state, are in general as follows:

The Arctic Barren Grounds, or Arctic Prairies, north of

the limit of trees, embracing the Barren Grounds of northern Canada, the great arctic archipelago, Ellesmere, Melville and Grant Lands and Greenland. This region is the home of the musk-ox and three species of arctic caribou.

The Alaska-Yukon Region, inhabited by the moose, white mountain sheep, mountain goat, four species of caribou and half a dozen species of Alaska brown, grizzly and black bears.

Northern Ontario, Quebec, Labrador and Newfoundland, inhabited by moose, woodland caribou, white-tailed deer and black bear.

British Columbia, inhabited by a magnificent big-game fauna embracing the moose, elk, caribou of two species, white sheep, black sheep, big-horn sheep, mule deer, white-tailed deer, mountain goat, grizzly, black and inland white bears.

The Sierra Madre of Mexico, containing jaguar, puma, grizzly and black bears, mule deer, white-tailed deer, antelope, mountain sheep and peccaries.

I have necessarily omitted all those regions of the United States and Canada which still contain a remnant of big game, but which have been literally "shot to pieces" by gunners.

In the United States and southern Canada there are about fifteen localities which contain a supply of big game sufficiently large so that a sportsman might therein hunt and kill one head per year with a clear conscience. *All others should be closed for five years!* Here is the list of availables; and regarding it there will be about as many opinions as there are big-game sportsmen:

THE WILDERNESS OF NORTH AMERICA (SHADED) AND THE ARCTIC PRAIRIES, WELL STOCKED WITH BIG GAME.

HUNTING GROUNDS WHEREIN IT IS RIGHT TO HUNT BIG GAME

The Maine Woods: Well stocked with white-tailed deer.

New Brunswick: Well stocked with moose; a few caribou, deer and black bear.

White Mountains of New Hampshire and Vermont: For deer.

The Adirondacks, New York: Well stocked with white-tailed deer, only.

Pennsylvania Mountains: Contain many deer and black bears, and soon will contain more.

South Carolina, Florida, Mississippi, Louisiana and Texas: White-tailed deer, and in some the black bear and lynx.

Northern Minnesota: Deer and moose.

Northern Michigan and Wisconsin: White-tailed deer.

Northwestern Wyoming: Thousands of elk in fall and winter; a few deer, grizzly and black bears, but no sheep that it would be right to kill.

Western and Southwestern Montana: Elk in season, mule and white-tailed deer; no sheep that it would be right to kill.

Northwestern Montana: Mule and white-tailed deer, only. No sheep, bear, moose, elk or antelope *to kill!*

Wyoming, East of Yellowstone Park: A few elk, by migration from the Park; a few deer, and bear of two species.

Northern Woods of Ontario and Quebec: Moose; deer.

Southern British Columbia: Goat, a few sheep and deer; grizzly bear. Moose, caribou and elk should not be killed.

Northern British Columbia: Six fine species of big game.

Northwestern Alberta: Grizzly bear, big-horn and mountain goat.

Under existing conditions I regard the above-named hunting-grounds as practically all in which it is right or fair for big-game hunting now to be permitted, even on a strict basis. Nearly all others should immediately be closed, for large game, for five years or longer.

Of course, such a proceeding, if carried into effect, would provoke loud protests from sportsmen, gunners, game-hogs, pot-hunters and others; but I wish that we had the power to carry such a programme as that into effect! *Then we would see some game in ten years;* and our grandchildren would thank us for having made effective some real big-game protection at a critical period.

Except in the few localities just mentioned, I regard the big-game situation in the United States and southern Canada as particularly desperate. Unless there is an immediate and complete revolution in this country from an era of slaughter to an era of preservation, as sure as the sun rises on the morrow this generation of Americans and near-Americans will live to see our country *swept clean of big game*, outside of the hard-and-fast game preserves, and places like Maine and the Adirondacks.

Even two years ago I did not believe this; but I do now. It is impossible to exaggerate the wide extent or the seriousness of this situation. In a country where any and every individual can rise and bluster, "I'm-just-as-good-as-*you*-are," and bellow for his "rights" as a "taxpayer," there is no stopping the millions who have a legal right to kill whenever

there is an open season. And to many Americans no right is dearer than the right to kill the game which by even the commonest law of equity belongs, not to the shooter exclusively, but partly to a great many other persons who don't shoot at all!

Unless we come to an "About, face!" in quick time, all our big game outside the preserves is doomed to sure and quick extermination. This is not an individual opinion, merely; it is a *fact*, and a hundred thousand men know it to be such.

In the winter of 1911–12, because the deer of Montana were driven by cold and hunger out of the mountains and far down into the ranchmen's valleys, eleven thousand of them were ruthlessly slaughtered. The state game warden sadly said that often heads of families took out as many licenses as there were persons in the family, and the whole quota was killed. Such people deserve to go deerless into the future; but we cannot allow them to rob innocent people.

OUR SPECIES OF BIG GAME

The Prong-Horned Antelope, unique and wonderful, will be one of *the first species of North American big game to become totally extinct.* We may see this come to pass within twenty years. They cannot be bred in protection, *save in very large fenced ranges.* They are delicate, capricious and easily upset. They die literally "at the drop of a hat." In several widely separated localities they are known to be affected with actinomycosis (lumpy-jaw), which in wild animals is incurable. I fear that this disease will materially help to exterminate the species.

Already all the states that possess wild antelope, except Nevada, have passed laws giving that species long close seasons; which is highly creditable to the states that have done their duty.

In 1908 Dr. T. S. Palmer published in his annual report of "Progress in Game Protection" the following in regard to the prong-horned antelope:

"Antelope are still found in diminished numbers in fourteen western states. A considerable number were killed during the year in Montana, where the species seems to have suffered more than elsewhere since the season was opened in 1907.

"A striking illustration of the decrease of the antelope is afforded by Colorado. In 1898 the state warden estimated that there were 25,000 in the state, whereas in 1908 the game commissioner places the number at only 2,000. The total number of antelope now in the United States probably does not exceed 17,000, distributed approximately as follows:

Colorado	2,000
Idaho	200
Montana	4,000
New Mexico	1,300
Oregon	1,500
Wyoming	4,000
Yellowstone Park	2,000
Other states	2,000
Saskatchewan	2,000
	19,000"

To-day the total number of antelope is much less than it was in 1908, and in spite of protection the number is steadily

diminishing. The existing bands, already small, are steadily growing smaller. The antelope are killed lawlessly, and the crimes of such slaughter are, in nearly every instance, successfully concealed.

Previously we have based strong hopes for the preservation of the antelope species on the herd in the Yellowstone Park, but those animals are vanishing fearfully fast. In 1908 the Yellowstone Park was credited with two thousand head. *In* 1913 *the number alive, by actual count, was only five hundred head ;* and this after twenty-five years of protection! Where have the others gone? This shows, alas! that perpetual close seasons do not *always* bring back the vanished thousands of game!

Here is a reliable report (June 29, 1912) regarding the prong-horned antelope in Lower California, from E. W. Nelson: "Antelope formerly ranged over nearly the entire length of Lower California, but are now gone from a large part of their ancient range, and their steadily decreasing numbers indicate their early extinction throughout the peninsula."

In captivity the antelope is exasperatingly delicate and short-lived. It has about as much stamina as a pet monkey. As an exhibition animal in zoological gardens and parks it is a failure; for it always looks faded, spiritless and dead, like a stuffed animal ready to be thrown into the discard. Zoologists cannot save the prong-horn species save at long range, in preserves so huge that the sensitive little beast will not even suspect that it is confined.

Two serious attempts have been made to transplant and

acclimatize the antelope—in the Wichita National Bison Range, in Oklahoma, and in the Montana Bison Range, at Ravalli. In 1911 the Boone and Crockett Club provided a fund which defrayed the expenses of shipping from the Yellowstone Park a small nucleus herd to each of those ranges. Eight were sent to the Wichita Range, of which five arrived alive. Of the seven sent to the Montana Range, four arrived alive and were duly set free. In 1913 four young were born in that little herd.

The province of Alberta, in Canada, still permits the hunting and killing of antelope; which is wholly and entirely wrong.

The Big-Horn Sheep.—Of North American big game, the big-horn of the Rockies will be, after the antelope, the next species to become extinct outside of protected areas. In the United States that event is fast approaching. It is far nearer than even the big-game sportsmen realize. There are to-day only two localities in the four states that still *think* they have killable sheep, in which it is worth while to go sheep-hunting. One is in Montana, and the other is in Wyoming. In the United States a really big, creditable ram may now be regarded as an impossibility. There are now perhaps half a dozen guides who can find killable sheep in our country, but the game consists nearly always of young rams, under five years of age.

All the states that still permit the killing of mountain sheep are making a particularly stupid and fatal blunder. Their game laws permit the killing of *rams* only, and with the fatuous folly of an imperilled ostrich that sticks its head in

the sand for safety, they think their female sheep are protected! As a matter of fact, *wherever rams are killed, ewes are killed!* Of course it is unlawful; but it is done. Everywhere the ewes are killed just as rapidly as the rams, and the mothers of the species are vanishing. And this in Wyoming, Montana, Idaho and Washington, in 1914!

That these four states should still continue to permit sheep-slaughter is outrageous. Their answer is that "the sportsmen won't stand for stopping it altogether." I will add: and the great mass of the people of those states are too criminally indifferent to take a hand in the matter, and *do their duty* regardless of the men of blood.

The seed stock of big-horn sheep now alive in the United States aggregates a pitifully small number. After twenty-five years of unbroken protection in Colorado, Dillon Wallace estimates, after an investigation on the ground, that the state possesses perhaps thirty-five hundred head. He credits Montana and Wyoming with five hundred each—which I think is far too liberal a number. I do not believe that either of those states contains more than one hundred unprotected sheep, at the very utmost limit. If there are more, where are they?

In the Yellowstone Park there are two hundred and ten head, safe and sound, and slowly increasing. I cannot understand why they have not increased more rapidly than they have. In Glacier Park, now under permanent protection, three guides on Lake McDonald, in 1910, estimated the number of sheep at seven hundred. Idaho has in her rugged Bitter Root and Clearwater Mountains and elsewhere, a remnant of pos-

WHY THE WHITE MOUNTAIN SHEEP ARE FAST DISAPPEARING!

Three of these sheep to a gun are too many.

sibly two hundred sheep, and Washington has only what chemists call "a trace." It has recently been discovered that California still contains a few sheep, and in southwestern Nevada there are a few more.

In Utah the big-horn species is probably quite extinct. In Arizona there are a few very small bands, very widely scattered. They are in the Santa Catalina Mountains, the Grand Canyon country, the Gila Range, and the Quitovaquita Mountains, near Sonoyta. But who can protect from slaughter those Arizona sheep? Absolutely no one! They are too few and too widely scattered for the game wardens to keep in touch with them. The "prospectors" have them entirely at their mercy, and the world well knows what prospectors' "mercy" to edible big game looks like on the ground. It leads straight to the frying-pan, the coyotes and the vultures.

The Lower California peninsula contains about five hundred mountain sheep, without the slightest protection save low, desert mountains, heat and thirst. But that is no real protection whatever. Those sheep are too fine to be butchered the way they have been, and now are being, butchered. In 1908 I strongly called the attention of the Mexican Government to the situation; and the Departmento de Fomento secured the issue of an executive order forbidding the hunting of any big game in Lower California without the written authority of the Government. I am sure, however, that, owing to the political and military upheaval, the Government never stopped the slaughter of sheep. In such easy mountains as those of Lower California, it is a simple matter to

exterminate quickly all the mountain sheep that they possess. The time for serious protective measures has fully arrived.

Both British Columbia and Alberta have even yet fine herds of big-horn, and we can count three large game preserves in which they are protected. They are Goat Mountain Park (East Kootenay district, between the Elk and Bull Rivers); the Rocky Mountains Park, near Banff, and Waterton Lakes Park, in the southwestern corner of Alberta.

In view of the number of men who desire to hunt them, the bag limit on big-horn rams in British Columbia and Alberta is still too liberal, by half. One ram per year for one man is *quite enough;* quite as much so as one moose is the limit everywhere. To-day "a big old ram" is regarded by sportsmen as a much more desirable and creditable trophy than a moose; because moose-killing is easy, and the bagging of an old mountain ram in real mountains requires five times as much effort and skill.

The splendid high and rugged mountains of British Columbia and Alberta form an ideal home for the big-horn (and mountain goat), and it would be an international calamity for that region to be denuded of its splendid big game. With resolute intent and judicial treatment, that region can remain a rich and valuable hunting-ground for five hundred years to come. Under falsely "liberal" laws, it can be shot into a state of complete desolation within ten years, or even less.

Other Mountain Sheep.—In northern British Columbia, north of Iskoot Lake, there lies a tremendous region, extending to the Arctic Ocean, and comprehending the whole area

between the Rocky Mountain continental divide and the waters of the Pacific. Over the southern end of this great wilderness ranges the black mountain sheep, and throughout the remainder, with many sheepless intervals, is scattered the white mountain sheep.

Owing to the immensity of this wilderness, the well-nigh total lack of railroads and also of navigable rivers, excepting the Yukon, it will not be thoroughly "opened up" for a quarter of a century. The few resolute and pneumonia-proof sportsmen who can wade into the country, pulling boats through icy-cold mountain streams, are not going to devastate those mountains of their herds of big game. The few head of game which sportsmen can and will take out of the great northwestern wilderness during the next twenty-five years will hardly be missed from the grand total, even though a few easily accessible localities are shot out. It is the deadly resident trappers, hunters and prospectors who must be feared! It takes from twenty-two to thirty-two mountain sheep to feed two Alaska or Yukon miners through one winter; and this according to their own figures.

And who can control the wilderness prospectors, miners, hunters and trappers? Can any wilderness government on earth make it possible? Therefore, *in time, even the great wilderness will be denuded of big game.* This is absolutely fixed and certain; for within much less than another century every square rod of it will have been gone over by prospectors, lumbermen, trappers and skin-hunters, and raked again and again with fine-toothed combs. A railway line to Dawson, the Copper River and Cook Inlet is to-day merely the next

thing to expect, after Canada's present railway programme has been wrought out.

Yes, indeed! In time the wilderness will be opened up, and the big game will *all* be shot out, save from the protected areas.

In Mexico there is little hoofed game to kill—deer of the white-tail groups, seven or eight species; the desert mule deer; the brocket; a *very* few prong-horned antelope and mountain sheep, and the peccary. The deer will not so easily be exterminated, but the antelope and sheep will be utterly destroyed. They will be the first to go; and I think they cannot by any possibility last longer than ten years. Is it not too bad that Mexico should permit her finest species of hoofed and horned game to be obliterated before she awakens to the desirability of conservation! The Mexicans could protect their small stock of big game if they would; but in Lower California they are leasing huge tracts of land to cattle companies, and they permit the lessees to kill all the wild game they please on their leased lands, even with the aid of dogs. This is a vicious and fatal system, and contrary to all the laws of nations.

The Mountain Goat.—Even yet this species is not wholly extinct in the United States. It survives in Glacier Park, Montana, and the number estimated in that region by three guide friends is too astoundingly large to mention.

This animal is much more easily killed than the big-horn. Its white coat renders it fatally conspicuous at long range during the best hunting season; it is almost devoid of fear, and it takes altogether too many chances on man. Thanks to the rage for sheep horns, the average sportsman's view-

point regarding wild life ranks a goat head about six contours below "old ram" heads, in desirability. Furthermore, most guides regard the flesh of the goat as almost unfit for use as food, and far inferior to that of the big-horn.. These reasons, taken together, render the goats much less persecuted by the sportsmen, ranchmen and prospectors who enter the home of the two species. It was because of this indifference toward goats that in 1905 Mr. John M. Phillips and his party saw two hundred and forty-three goats in thirty days in Goat Mountain Park and only fourteen sheep.

Unless the preferences of western sportsmen and gunners change very considerably, the coast mountains of the great northwestern wilderness will remain stocked with wild mountain goats until long after the last big-horn has been shot to death. Fortunately, the skin of the mountain goat has no commercial value. I think it was in 1887 that I purchased, in Denver, one hundred and fifty nicely tanned skins of our wild white goat *at fifty cents each!* They were needed for the first exhibit ever made to illustrate the extermination of American large mammals, and they were shown at the Louisville Exposition. It must have cost the price of those skins to tan them; and I was pleased to know that some one lost money on the venture.

At present the mountain goat extends from northwestern Montana to the head of Cook Inlet, but it is not found in the interior or in the Yukon Valley. Whenever man decides that the species has lived long enough, he can quickly and easily exterminate it. It is one of the most picturesque and interesting wild animals on this continent, and there is not

the slightest excuse for shooting it, save as a specimen of natural history. Like the antelope, it is so valuable as a natural curiosity that it deserves to be taken out of the ranks of animals that are regularly pursued as game.

The Elk.—The story of the progressive extermination of the American elk, or wapiti, covers practically the same territory as the tragedy of the American bison—one-third of the mainland of North America. The former range of the elk covered absolutely the garden ground of our continent, omitting the arid region. Its boundary extended from central Massachusetts to northern Georgia, southern Illinois, northern Texas and central New Mexico, central Arizona, the whole Rocky Mountain region up to the Peace River, and Manitoba. It skipped the arid country west of the Rockies, but it embraced practically the whole Pacific slope from central California to the north end of Vancouver Island.

The extermination of the wapiti began with the settlement of the American colonies. Naturally, the largest animals were the ones most eagerly sought by the meat-hungry pioneers, and the elk and bison were the first game species to disappear. The colonists believed in the survival of the fittest, and we are glad that they did. The one thing that a hungry pioneer cannot withstand is—temptation—in a form that embraces five hundred pounds of succulent flesh. And let it not be supposed that in the eastern states there were only a few elk. The Pennsylvania salt licks were crowded with them, and the early writers describe them as existing in "immense bands" and "great numbers."

Of course it is impossible for wild animals of great size to

exist in countries that are covered with farms, villages and people. Under such conditions the wild and the tame cannot harmonize. It is a fact, however, that elk could exist and thrive in every national forest and national park in our country, and also on uncountable hundreds of thousands of rough, wild, timbered hills and mountains such as exist in probably twenty-five different states. There is no reason, except man's short-sighted greed and foolishness, why there are not to-day one hundred thousand elk living in the Alleghenies Mountains, furnishing each year fifty thousand three-year-old males as free food for the people.

The trouble is—the greedy habitants *could not* be induced to kill only the three-year-old males, in the fall, and let the cows, calves and breeding bulls alone! By sensible management the Rocky Mountains, the Sierra Nevadas and the Coast Range would support enough wild elk to feed a million people. But "civilized" man seems utterly incapable of maintaining anywhere from decade to decade a large and really valuable supply of wild game. Outside the Yellowstone Park and northwestern Wyoming, the American elk exists only in small bands—mere remnants and samples of the millions we could and should have.

If they could be protected, and the surplus presently killed according to some rational, working system, then *every national forest in the United States should be stocked with elk!* In view of the awful cost of beef, it is high time that we should consider the raising of game on the public domain on such a basis that it would form a valuable food supply without diminishing the value of the forests.

At present the American people are sorely puzzled by a remarkable elk problem that each winter is presented for solution in the Jackson Hole country, Wyoming. Driven southward by the deep snows of winter, the elk thousands that in summer graze and grow fat in the Yellowstone Park march down into Jackson Hole, to find in those valleys less snow and more food. Now, it happens that the best and most of the former winter grazing grounds of the elk are covered by fenced ranches! As a result, the elk that strive to winter there, about fifteen thousand head, are each winter threatened with starvation; and during three or four winters of recent date, an aggregate of several thousand calves, weak yearlings and weakened cows perished of hunger. The winters of 1908, 1909 and 1910 were progressively more and more severe; and 1911 saw about two thousand five hundred deaths. (S. N. Leek.)

In 1909–10, the state of Wyoming spent $7,000 for hay, and fed it to the starving elk. In 1911 Wyoming spent $5,000 more, and appealed to Congress for help. Thanks to the efforts of Senator Lodge and others, Congress instantly responded with a splendid emergency appropriation of $20,000, partly for the purpose of feeding the elk and also to meet the cost of transporting elsewhere as many of the elk as it might seem best to move. The starving of the elk ceased with 1911.

In order to provide adequate winter grazing grounds for the Yellowstone-Wyoming elk, it seemed imperative that the National Government should expend between $30,000 and $40,000 in buying back from ranchmen certain areas

in the Jackson Valley, particularly a tract known as "the swamp," and others on the surrounding foot-hills where the herds annually go to graze in winter. A measure to render this possible was presented to Congress in the winter of 1912, and without opposition an appropriation of $45,000 was made.

The photographs of the elk herds that recently have been made by S. N. Leek, of Jackson Hole, clearly reveal the fact that the herds now consist chiefly of cows, calves, yearlings and young bulls with small antlers. In one photograph (see page 67) showing about 2,500 elk, there are not visible even half a dozen pairs of antlers that belong to adult bulls. There should be a hundred! This condition means that the best bulls, with the finest heads, are constantly being selected and killed by sportsmen and others who want their heads; and the young, immature bulls are left to do the breeding that alone will sustain the species.

It is a well-known principle in stock-breeding that sires should be fully adult, of maximum strength, and in the prime of life. No stock-breeder in his senses ever thinks of breeding from a youthful, immature sire. The result would be weak offspring, not up to the standard.

This inexorable law of inheritance and transmission is just as much a law for the elk, moose and deer of North America as it is for domestic cattle and horses. If the present conditions in the Wyoming elk herds continue to prevail for several generations, as sure as time goes on we shall see a marked deterioration in the size and antlers of the elk.

It is impossible to maintain any large-mammal species at its zenith of size, strength and virility by continuous breed-

ing of the young and immature males. By some sportsmen it is believed that through long-continued killing of the finest and largest males, the red deer of Europe have been growing smaller; but on that point I am not prepared to offer evidence.

In regard to the in-breeding of the elk herds in large open parks and preserves throughout North America, there are positively *no ill effects to fear*. Wild animals that are *closely* confined, generation after generation, are bound to deteriorate physically; but with healthy wild animals living in large open ranges, feeding and breeding naturally, the in-breeding that occurs produces no deterioration.

White-Tailed Deer.—In "Our Vanishing Wild Life" I have noted the quick and thorough success with which the white-tailed deer has been brought back in Vermont, Massachusetts, Connecticut and southern New York.

No state having waste lands covered with brush or timber need be without the ubiquitous white-tailed deer. Give them a semblance of a fair show, and they will live and breed with surprising fecundity and persistence. If you start a park herd with ten does, soon you will have more deer than you will know how to dispose of, unless you market them under a Bayne law, duly tagged by the state. In close confinement this species fares rather poorly. In large preserves it does well, but during the rutting season the bucks are to be dreaded; and those that develop aggressive traits should be shot and marketed. This is the only way in which the deer parks of England are kept safe for unarmed people.

At this date deer-hunting is not permitted at any time in Indiana, Illinois, Iowa, Nebraska and Kansas—where there

are no wild deer; or in Rhode Island, Connecticut, Delaware, Tennessee or Kentucky. The long close seasons in Massachusetts, Connecticut and southern New York have caused a

THE WHITE-TAILED DEER AS A FOOD SUPPLY.
But the killing of the females was totally wrong.

great migration of deer into those once-depopulated regions —in fact, right down to tide-water.

The Mule Deer.—The number of sportsmen who have hunted and killed this fine animal in its own wild and picturesque bad lands is indeed quite small. It has been four-fifths exterminated by the resident hunter and ranchman, and to-day is found in the Rocky Mountain region most sparingly. Ten years ago it seemed right to hunt the so-called Rocky Mountain "black-tail" in northwestern Mon-

tana, because so many deer were there it did not seem to spell extermination. Now conditions have changed. Since last winter's great slaughter in northwestern Montana, of eleven thousand hungry deer, the species has been so reduced that it is no longer right to kill mule deer anywhere in our country, and a universal close season for five years is the duty of every state which contains that species.

The Real Black-Tailed Deer, of the Pacific coast (*Odocoileus columbianus*), is, to most sportsmen of the Rocky Mountains and the East, actually less known than the okapi! Not one out of every hundred of them can recognize a mounted head of it at sight. It is a small, delicately formed, delicately antlered understudy of the big mule deer, and now painfully limited in its distribution. It is *the* deer of California and western Oregon, and it has been so ruthlessly slaughtered that to-day it is going fast. As conditions stand to-day, and without a radical change on the part of the people of the Pacific coast, this very interesting species is bound to disappear. It will not be persistent, like the white-tailed deer, but in the heavy forests it will last much longer than the mule deer.

My information regarding this deer is like the stock of specimens of it in museum collections—meagre and unsatisfactory. We need to know in detail how that species is faring to-day, and what its prospects are for the immediate future. In 1900 I saw great piles of skins from it in the fur-houses of Seattle, and the sight gave me much concern.

The Caribou Generally.—I think it is not very difficult to forecast the future of the genus *Rangifer* in North

America, from the logic of the conditions of to-day. Thanks to the splendid mass of information that has been accumulated regarding this group, we are able to draw certain conclusions. I think that the caribou of the Canadian Barren Grounds and northeastern Alaska will survive in great numbers for at

DEER DESTRUCTION IN MONTANA, 1913.
The most deadly of all hunters is the one who kills females and young! *This is extermination!*

least another century; that the caribou herds of Newfoundland will last nearly as long, and that in fifty years or less all the caribou of the great northwestern wilderness will be swept away.

The reasons for these conclusions are by no means obscure, or far-fetched.

In the first place, the Barren Ground caribou are to-day enormously numerous—undoubtedly running up into millions. It cannot be possible that they are being killed faster

than they are breeding; and so they must be increasing. Their food supply is unlimited. They are protected by two redoubtable champions—Jack Frost and the Mosquito. Their country never will contain a great human population. The natives are so few in number, and so lazy, that even though they should become supplied with modern firearms it is unlikely that they ever will make a serious impression on the caribou millions. The only thing to fear for the Barren Ground caribou throngs is disease—a factor that is beyond human prediction.

It is reasonably certain that the Barren Grounds never will be netted by railways—unless gold is discovered over a wide area. The fierce cold and hunger and the billions of mosquitoes of the Barren Grounds will protect the caribou from the wholesale slaughter that "civilized" man joyously would inflict—if he had the chance.

The caribou thousands of Newfoundland are fairly accessible to sportsmen and pot-hunters, but at the same time the colonial Government can protect them from extermination if it will. Already much has been done to check the reckless and wicked slaughter that once prevailed. A bag limit of three bull caribou per annum has been fixed, which is enforced as to non-residents and sportsmen, but in a way that is much too "American" it is often ignored by residents in touch with the game. For instance, the guide of a New York gentleman whom I know admitted to my friend that each year he killed "about twenty-five" caribou for himself and his family of four other persons. He explained thus: "When the inspector comes around I show him two caribou

hanging in my wood-shed, but back in the woods I have a little shack where I keep the others until I want them."

The real sportsmen of the world never will make the slightest perceptible impression on the caribou of Newfoundland. For one thing, the hunting is much too tame to be interesting. If the caribou of that island ever are exterminated, it will be strictly by the people of Newfoundland themselves. If the Government will tighten its grip on the herds, they need never be exterminated.

The caribou of New Brunswick, Quebec and Ontario are few and widely scattered. Unless carefully conserved they are not likely to last long; for their country is annually penetrated in every direction by armed men, white and red. There is no means by which it can be proven, but from the number of armed men in those regions I feel sure that the typical woodland caribou species is being shot faster than it is breeding. The sportsmen and naturalists of Canada, and especially those of New Brunswick, would render good service by making a close and careful investigation of that question.

The caribou of the northwestern wilderness are in a situation peculiarly their own. They inhabit a region of naked mountains and *thin* forests, wherein they are conspicuous, easily stalked and easily killed. Nowhere do they exist in large herds of thousands, or even of many hundreds. They live in small bands of from ten to twenty head, and even those are far apart. The region in which they live is certain to be thoroughly opened up by railways and exploited. Fifty years from now we shall find every portion of the now wild Northwest fairly accessible by rail. The building of the

railways will be to the caribou—and to other big game—the day of doom. In that wild, rough region no power on earth —save that which might be able to deprive *all* the inhabitants and all visitors of firearms—can possibly save the game outside of a few preserves that are diligently patrolled.

The big game of the northwest region, in which I include the interior of Alaska, *will go!* It is only a question of time. Already the building of the city of Fairbanks and the exploitation of the mining districts surrounding it have led to such harassment and slaughter of the migrating caribou that the great herd which formerly traversed the Tanana country once a year has completely changed its migration route and now keeps much farther north. The "crossing" of the Yukon near Eagle City has been abandoned. A hundred years hence the northwestern wilderness will be dotted with towns and crisscrossed with railways; but the big game of it will be gone, except in the preserves that are yet to be made. This will particularly involve the caribou, moose and mountain sheep of all species, which will be the first to go. The mountain goat and the forest bears will hold out longer than their more exposed neighbors of the treeless mountains.

The Moose.—In the United States the moose is found in five states—Maine, Minnesota, Montana, Wyoming and Idaho. There are 550 in the Yellowstone Park. In Maine and Minnesota only may moose be hunted and killed. In the season of 1909 moose to the number of 184 were killed in Maine—a large total, considering the small moose population of that state. In northern Minnesota we now possess a great national moose preserve of 909,743 acres; and in 1908

Mr. Fullerton, after a personal inspection in which he saw 189 moose in nine days, estimated the total moose population of the present day at 10,000 head. This is a moose preserve worth while.

Outside of protected areas the moose is the animal that is most easily exterminated. Its trail is easily followed and its habits are thoroughly known, down to three decimal places. As a hunter's reward it is great. Strange to say, New Brunswick has found that the moose is an animal that it is possible, and even easy, to protect. The death of a moose is an event that is not easily concealed! Wherever it is thoroughly understood that the moose law will be enforced, the would-be poacher pauses to consider the net results to him of a jail sentence.

In New Brunswick we have seen two strange things happen during our own times. We have seen the moose migrate into, and permanently occupy, an extensive area that previously was destitute of that species. At the same time we have seen a reasonable number of bull moose killed by sportsmen without disturbing in the least the general equanimity of the general moose population! And at this moment the moose population of New Brunswick is almost incredible. Every moose-hunter who goes there sees from 20 to 40 moose, and two of my friends last year saw, "in round numbers, about 100!" Up to date the size of adult antlers seems to be maintaining a high standard.

In summer the photographing of moose in the rivers, lakes and ponds of Maine and New Brunswick amounts to an industry. I am uneasy about the constant picking off of

the largest and best breeding bulls of the Mirimachi country, lest it finally reduce the size and antlers of the moose of that region; but only the future can tell us just what the result of this practice will be.

The Biological Survey of the Department of Agriculture has by legal proclamation converted the whole of the Kenai Peninsula, in Alaska, into a moose preserve. This will save *Alces gigas*, the giant moose of Alaska, from extermination; and New Brunswick and the Minnesota preserve will save *Alces americanus*. But in the northwest we can positively depend upon it that eventually, wherever the moose may legally be hunted and killed by any Tom, Dick or Harry who can afford a twenty-dollar rifle and a license, the moose will surely disappear.

The moose laws of Alaska are strict—*toward sportsmen, only!* The miners, "prospectors" and Indians may kill as many as they please, "for food purposes." This opens the door to a great amount of unfair slaughter. Any coffee-cooler can put a pan and pick into his hunting-outfit, go out after moose, and call himself a "prospector."

I grant that the *real* prospector, who is looking for ores and minerals with an intelligent eye, and knows what he is doing, should have special privileges on game to keep him from starving. The settled miner, however, is in a different class. No miner should ask the privilege of living on wild game, any more than should the farmer, the steamboat man, the railway laborer or the soldier in an army post. The Indian should have no game advantages whatever over a white man. He does not own the game of a region any more

than he owns its minerals or its water-power. He should obey the general game laws, just the same as white men. In Africa the white population wisely prohibits the natives, as far as possible, from owning or using firearms, and a good idea it is, too. I am glad there is one continent on which the "I'm-just-as-good-as-you-are" nightmare does not curse the whole land.

The Musk-Ox.—Now that the north pole has been safely discovered, the harried musk-ox herds of the farthest north are having a rest. I think that most American sportsmen have learned that as a sporting proposition there is about as much fun and glory in harrying a musk-ox herd with dogs, and picking off the members of it at "parade rest," as there is in shooting range cattle in a round-up. The habits of the animal positively eliminate the real essence of sport—difficulty and danger. When a musk-ox band is chased by dogs, or by wolves, the full-grown members of it, bulls and cows alike, instantly form a close circle around the calves, facing outward shoulder to shoulder, and stand at bay. Against an enemy without a rifle, such a formation is invincible!

For some reason the musk-ox herds do not seem to have perceptibly increased since man first encountered them. The number alive to-day appears to be no greater than it was fifty years ago; and this leads to the conclusion that the present delicate balance could easily be disturbed the wrong way. Fortunately, it seems reasonably certain that the Indians of the Canadian Barren Grounds, the Eskimo of the Far North and the stray explorers all live outside the haunts of the species, and come in touch only with the edge of the

musk-ox population as a whole. This leads us to hope and believe that, through the difficulties involved in reaching them, the main bodies of musk-ox of both species are safe from extermination.

Nevertheless the time has come for Canada, the United States and Denmark to join in formulating a stiff law for the prevention of wholesale slaughter of musk-ox for sport. It should be rendered impossible for another "sportsman" to kill twenty-three head in one day, as once occurred. Give the sportsman a bag of three bulls, and no more. To this no true sportsman will object, and the objections of game-hogs only serve to confirm the justice of the thing they oppose.

The Grizzly Bear.—To many persons it may seem strange that any one should feel disposed to accord protection to such fierce predatory animals as grizzly bears, lions and tigers. But the spirit of fair play springs eternal in some human breasts. The sportsmen of the world do not stick at using long-range, high-power repeating rifles on big game, but they draw the line this side of traps, poisons and extermination. The sportsmen of India once thought—for about a year and a day—that it was permissible to kill troublesome and expensive tigers by poison. Mr. G. P. Sanderson tried it, and when his strychnine operations promptly developed three bloated and disgusting tiger carcasses, even his native followers revolted at the principle. That was the alpha and omega of Sanderson's poisoning activities.

I am quite sure that if the extermination of the tiger from the whole of India were possible, and the to-be or not-to-be were put to a vote of the sportsmen of India, the answer

would be a thundering "*No!*" Says Major J. Stevenson-Hamilton in his "Animal Life in Africa": "It is impossible to contemplate the use against the lion of any other weapon than the rifle."

The real sportsmen and naturalists of America are decidedly opposed to the extermination of the grizzly bear. They feel that the wilds of North America are wide enough for the accommodation of many grizzlies, without crowding the proletariat. A Rocky Mountain without a grizzly upon it, or at least a bear of some kind, is only half a mountain—commonplace and tame. Put one two-year-old grizzly cub upon it, and presto! every cubic yard of its local atmosphere reeks with romantic uncertainty and fearsome thrills.

A few persons have done considerable talking and writing about the damage to stock inflicted by bears, but I think there is little justification for such charges. Certainly there is not one-tenth enough real damage done by bears to justify their extermination. At the present time we hear that the farmers (!) of Kadiak Island, Alaska, are being seriously harassed and damaged by the big Kadiak bear—an animal so rare and shy that it is very difficult for a sportsman to kill one! I think the charges against the bears—if the Kadiak Islanders ever really have made any—need to be proven, by the production of real evidence.

In the United States, outside of our game preserves, I know of not one locality in which grizzly bears are sufficiently numerous to justify a sportsman in going out to hunt them. The California grizzly, once represented by "Monarch" in Golden Gate Park, is almost, if not wholly, extinct. In

Montana, outside of Glacier Park, it is useless to apply for wild grizzlies. In the Bitter Root Mountains and Clearwater Mountains of Idaho there are grizzlies, but they hide so effectually under the snow-bent willows on the "slides" that it is almost impossible to get a shot at one of them. Northwestern Wyoming still contains a few grizzlies, but there are so many square miles of mountains around each animal it is now almost useless to go hunting for them. British Columbia, western Alberta and the coast mountains, at least as far as Skaguay, and Yukon Territory generally, all contain grizzlies, and the sportsman who goes out for sheep, caribou and moose is reasonably certain to see half a dozen bears and kill at least one or two. In those countries the grizzly species will hold forth long after all killable grizzlies have vanished from the United States.

I think that it is now time for California, Montana, Washington, Oregon, Idaho and Wyoming to give grizzly bears protection of some sort. Possibly the situation in those states calls for a five-year close season. Even British Columbia should now place a bag limit on this species. This has seemed clear to me ever since (in the spring of 1912) two of my friends killed *six* grizzlies in one week! But Provincial Game Warden A. Bryan Williams says that at present it would be impossible to impose a bag limit of one per year on the grizzlies of British Columbia; and Mr. Williams is a sincere game-protector.

The Brown Bears of Alaska.—These magnificent monsters present a perplexing problem which I am inclined to believe can be satisfactorily solved by the Biological Sur-

vey only in short periods, say of three or four years each. Naturally, the skin-hunters of Alaska ardently desire the skins of those bears, for the money they represent. That side of the bear problem does not in the least appeal to the ninety-odd millions of people who live this side of Alaska. The skins of the Alaskan brown bears have little value save as curiosities, nailed upon the wall, where they cannot be stepped upon and injured. The *hunting* of those bears, however, is a business for men; and it is partly for that reason they should be preserved. A bear-hunt on the Alaska Peninsula, Admiralty or Montagu Islands, is an event of a lifetime, and with a bag limit of *one* brown bear the species would be quite safe from extermination.

The Black Bear is an interesting citizen. As a rule, he harms nobody nor anything; he affords good sport; he objects to being exterminated, and wherever in North America he is threatened with extermination he should at once receive protection! A black bear *in the wilds* is harmless. In captivity, posed as a household "pet," he is decidedly dangerous and had best be given the middle of the road. In big forests he is a persistent resident, and will not be exterminated from the fauna of the United States during the next quarter-century.

Conclusion.—The logical conclusion to be drawn from the persistent destruction of the big game of North America is that Congress should immediately make every national forest a national game preserve, in which, for the present at least, no hunting should be allowed save the hunting of highly destructive predatory animals.

The present death rate of big game cannot long continue without the disappearance of killable big game down to the vanishing-point. Existing laws are utterly inadequate to stop the poacher and the meat-butcher. The question is: Will the people of the United States and Canada *now* arouse, and adopt the sweeping measures that are vitally necessary, and which alone can save and restore a supply of grand game for the sportsmen of the future?

Our present ghastly system of legal slaughter and extermination means the sure extermination of everything, save the white-tailed deer, outside of the rigidly protected game preserves.

Americans and Canadians, take your choice: Shall it be all for the men of to-day, or conservation, and a square deal to the men of the future?

BIRDS

THE WHITE-HEADED EAGLE.

CHAPTER XVIII

AN INTRODUCTION TO THE BIRD WORLD

Bird Destruction.—There are many things to be learned about birds besides their names, and their length in millimetres. To-day the first thing to be taught is the fact that from this time henceforth *all birds must be protected, or they will all be exterminated.* Every reader is particularly requested to read the whole of Chapter XXXVIII, which appears at the end of Volume III of this work, entitled: "The Slaughter of North American Birds."

To-day it is a safe estimate that there are *ten million shotguns at large in the United States*, and a loaded cartridge for each living bird. Each succeeding year produces about five hundred thousand more shotguns, seven hundred million cartridges and a new crop of gun-demons, eager to slay, ambitious to make records as sportsmen or collectors. If a bird is so unfortunate as to possess plumes, or flesh which can be sold for ten cents, the mob of pot-hunters seeks it out, even unto the ends of the earth.

In 1897–98 the writer made for the New York Zoological Society a careful inquiry into the volume of bird life in the United States, with special reference to its increase or decrease during the fifteen years prior to that date. From one

hundred and eighty competent and conscientious observers, representing thirty-four states and territories, reports were received in answer to a series of questions, all of which were carefully tabulated.[1] Throughout my calculations, wherever a doubt existed, the living birds were given the full benefit of it.

Four states, Kansas, Wyoming, Utah and Washington, showed an increase in bird life. Thirty states showed decreases varying from ten per cent to ninety per cent, but with a general average decrease from 1883 to 1898 of *forty-six per cent!* In the adjoining diagram, the shaded portions show the percentages of decrease throughout the states named during the period reported upon.

DECREASE IN BIRD LIFE

Since the inquiry of 1898 was made, the volume of bird life in the United States has undergone the following changes:

The closing of the game markets of New York and Massachusetts has caused a great increase in water-fowl throughout the northeastern quarter of the United States.

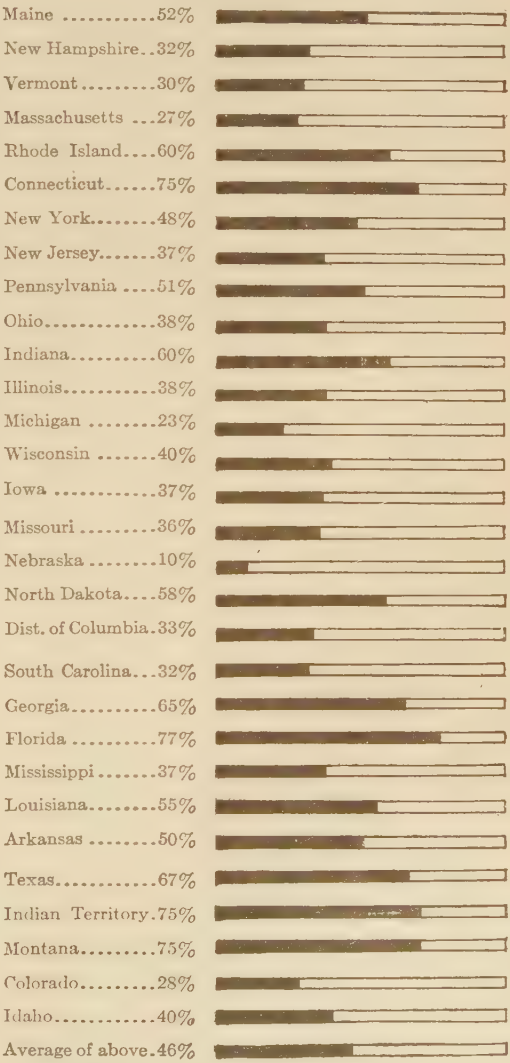
The shore birds have so alarmingly decreased that extinction threatens many species unless the new federal migratory bird law, protecting all species save six from all shooting during the next five years, succeeds in bringing them back. Their return is doubtful.

The slaughter of song-birds by Italians in the North, and

[1] "The Destruction of Our Birds and Mammals." By William T. Hornaday. Second Annual Report (1898) of the New York Zoological Society.

by negroes and poor whites in the South, has caused an enormous numerical decrease in our best-beloved and most valuable insect-eating song-birds, woodpeckers, swallows and martins, goatsuckers, and some other birds. Many species have been locally exterminated.

The farmer's best friend, the bob-white, has been nearly exterminated throughout many northern states, by wicked and foolish persecution with the shotgun. Many states are anxious to buy quail, or breed quail, with which to restock their depleted covers, and repair their wicked blunders, but the supply desired is totally wanting. Southern quail are unable to survive in the North, and no northern quail are obtainable.



DECREASE IN BIRD LIFE IN THIRTY STATES.

All the members of the Grouse Family have been steadily diminishing, and it is absolutely certain the brakes will not be put on until it is too late to bring back the vanished millions. The selfish and foolish gunners of this country are determined to exterminate the grouse, quail and wild turkey, before they lay aside their guns; and numerically they are strong enough to have their way. Twenty years hence all those who wish to study these birds will be able to do so only in museums and books.

The herons, egrets, cranes and rails all have steadily gone on decreasing until only remnants are left.

Causes of Decrease in Bird Life

The temptation to offer a full statement of the causes and means of prevention of bird-slaughter is very great; but those subjects must be left to other pages. There is, however, much food for thought in the following summary of causes of destruction, as reported by the one hundred and forty-four observers who entered into the investigation made by the author in 1898. They are listed very nearly in the order of their importance according to the reports, and they refer to conditions as they existed in 1898:

NO.		REPORTS
1.	Sportsmen, and "so-called sportsmen"	54
2.	Boys who shoot	42
3.	Market-hunters and "pot-hunters"	26
4.	Plume-hunters, and milliners' hunters	32
5.	"Shooters, generally"	21
6.	Egg-collecting, chiefly by small boys	20
7.	English sparrow	18
8.	Clearing off timber, development of towns and cities	31

NO.		REPORTS
9.	Italians, and others, who devour song-birds	12
10.	Cheap firearms	5
11.	Drainage of marshes	5
12.	Non-enforcement of laws	5
13.	Gun-clubs and hunting contests	5
14.	Collectors (ornithologists and taxidermists)	5
15.	Colored population[1]	4
16.	Indians (for decrease of game quadrupeds)	4

THE SLAUGHTER OF BIRDS FOR FOOD.—The craze for the destruction of bird life is almost beyond belief. No matter how much the bird-protectors may say about the destruction of our birds, and their impending extermination, far more than the half will remain untold. As our game birds become fewer and fewer, the market shooters begin to slaughter birds of song and beauty, which twenty years ago were safe because they were not considered "game." Even twenty years ago no self-respecting American would have lowered himself to the level of the hawk and buzzard by killing and eating the poor little sandpiper and snow bunting. But mark what is going on to-day:

In 1903 there came into the courts the case of the People of the State of New York against two men of New York City, to enforce the payment of fines amounting to $1,168,315 for having in their possession contrary to law, in a cold-storage warehouse, certain dead birds out of season, game and not game. When the state game wardens searched the premises of the defendants, they found the following appalling mass of birds:

[1] Since the rise in the price of cotton put a shotgun into the hands of every adult male country negro in the South, this factor of destruction has risen to about the fourth place.

8,058 Snow Buntings!
7,607 Sandpipers!
5,218 Plover!
7,003 Snipe,
788 Yellow Legs,
7,560 Grouse,
4,385 Quail,
1,756 Ducks,
288 Bobolinks,
96 Woodcock.

And all this in one cold-storage warehouse, for poor, starving New York!

To the public it was a profound surprise to find that snow buntings and sandpipers were being slaughtered by thousands for food. At that time at least half a dozen species of song-birds were served on bills of fare under the name of "reed bird." This fact is equivalent to a notice that hereafter no bird is safe from the deadly "market-shooter," and only the strictest watch and the severest measures will save any considerable portion of our birds.

But a better day has dawned over New York. The enactment of the justly famous "Bayne law" (1911), absolutely closing all markets, hotels and restaurants in New York state against the sale of native wild game of all kinds, wrought for New England a revolution. In 1912 Massachusetts followed the good example of New York; and in 1913 California, after a long and bitter fight, passed similar laws which to-day the enemies of wild life are trying hard to repeal.

Protect the Birds.—The birds are the natural protectors of the farm, the garden, the orchard and the forests from the hordes of insects which without them ravage leaf, flower and fruit. But for the hawks and owls, the wild mice and rats soon would multiply into an intolerable pest. But for the insectivorous birds, destroying grubs and perfect insects by the million, the life of the farmer, fruit-grower and

forester would be one long battle against the pests of the insect world.

Learn that it is wise to encourage birds, as well as to protect them from slaughter. A little food intelligently bestowed is always accepted as a token of friendship and hospitality. Any country dweller can draw birds around him, if he will. Why grudge a few simple shelter-boxes, a few handfuls of grain and a few pounds of fat pork when in exchange for them you may have, even in winter's dreariness, the woodpeckers, chickadees, juncos and many other winter "residents" and "visitants"? Surely, no right-hearted man or boy can prefer solitude to the company of cheerful and beautiful feathered friends.

Don't Make Bird or Egg "Collections."—Learn to take broad views—bird's-eye views, if you please—of the bird world. Consider how you can promote its enjoyment, its betterment and its perpetuation. Think not that in order to take an interest in birds it is necessary to buy a gun and a bushel of cartridges. Don't think that a badly made bird-skin in a smelly drawer is as pleasing an object in the sight of God or man as the living bird would be. Do not, I beg of you, make a "collection of bird-skins"; for the "bird-skin habit," when given free rein, becomes a scourge to the bird world.

Do not think that ornithology is the science of dead birds, named in a dead language; or that an attic room is the best field for the study of birds. Study bird-*life*, not merely the mummied remains of dead birds. And, finally, *don't* collect eggs! They teach no useful lesson. The ma-

jority of them have no beauty, and are as meaningless as marbles. The pursuit of them is interesting, I grant, but the possession nearly always palls. The collector of eggs destroys life, fearfully, and has for all his labors and his pains only such as this:—O O o o.

If you think enough of birds *to mount, or have mounted*, every fine specimen that you kill—aside from legitimate game—then you may be justified in forming a collection. There is some excuse for collections of well-mounted birds, especially those that *are presented to schools*, where thousands of young people may study them; but wild life is now becoming so scarce that the making of large private collections, for the benefit of one man, is a sin against Nature.

The Reasonable Study of Birds.—In studying birds, do not be narrow! Use the field-glass, the camera and pencil, rather than the shotgun and the microscope. Any fool with a gun can kill a bird; but it takes intelligence and skill to photograph one.

It is not at all necessary that people generally should be able to name correctly every bird that the forest and field may disclose. Many species of warblers, and sparrows, and larger birds also, are so much alike that it is very difficult for any one save a trained ornithologist to analyze them correctly. The general public is not interested in differences that are nearly microscopic. When birds and mammals cannot be recognized without killing them, and removing their skulls, it is quite time to draw the line.

It is entirely possible for any intelligent person to become well acquainted with at least one hundred and twenty-five

of our birds without killing one; and any person who can at sight recognize and claim acquaintance with that number of bird species may justly claim to be well informed on our birds. Because birds are more common than quadrupeds, bird-books are also more common, and now the most of them are beautifully illustrated. The road to ornithology is now strewn with flowers, and the rough places have been made smooth.

The time was when the analysis and classification of our American birds were important work, because our bird fauna was only partially discovered and written up. In their days, Audubon, Wilson, Baird and Coues did grand work, because so many birds were strange, and needed introducing. The time was when analyzing, naming and working up geographical distribution were desirable and necessary. But *in North America that period has gone by!* There is no longer any real need for new technical books on the birds of this continent north of Mexico. The describing and re-describing, the naming, re-naming and tre-naming of microscopic varieties, has been done enough, and in places overdone. The total sum of bird facts available regarding the birds of North America is already enormous. It is time to digest those facts and see what they mean.

Practical Work to be Done.—Henceforth, these things should be done by all bird-lovers for our American birds:

1. Join actively in protecting the few birds that remain, and help to save them from complete extermination.

2. Aid in teaching the millions how to know and enjoy the beautiful and useful birds without destroying them.

3. Loyally and vigorously support the National Government and your own state authorities in enforcing most vigorously all the terms of the new federal law for the protection of our six hundred and ten species of migratory birds.

4. Insist upon it that your state shall afford full and adequate protection to all your grouse, quail, wild turkeys (if any) and all other birds that are not migratory.

5. Help to close all the markets of your state against the sale of all native wild game save that reared in captivity, and officially tagged for sale by your state authorities.

The Vastness of the Bird World.—Go where you will upon this earth—save in the great deserts—some members of the bird world will either bear you company, or greet you as you advance. Some will sing to cheer you, others will interest and amuse you by the oddities of their forms and ways. On the mountain backbone of the continent, you will meet the spruce grouse, the raven and the mountain jay. In the foot-hills and on the great sage-brush plains, the stately sage grouse and the garrulous magpie still break the monotony.

In the fertile regions of abundant rain, bird life is—or rather *was* once—bewildering in its variety. In the tropics, the gorgeous colors and harsh voices of the birds remind you that you are fairly within another world. In mid-ocean, the stormy petrel causes you to wonder how it survives the storms. On the bald mountains of Alaska, or the barren shores of the Arctic Ocean, the snow-white ptarmigan may be the means of saving you from death by starvation; and when you discover new lands in the mysterious and forbidding waters of the

Antarctic, the huge and helpless emperor penguin will be there to greet you.

The greatest wonders of bird life are the immense variety of its forms and the manner in which the members of the various groups have been equipped to perform so many functions in the economy of life. It seems as if Nature has undertaken to furnish birds for every portion of the globe, and provide food and shelter for each in its own place. This is why different birds fly, wade, swim, dive, scratch, run and climb.

Foundation Work in Bird Study.—To-day, in the primary schools, little children learn something of the wild birds by which they are surrounded. These studies of Nature are but contributions of bricks and mortar toward what must be the complete building. It is now our purpose to lay the foundation for a structure of bird knowledge which may be built upon all through life, as elaborately as the builder may choose. But even those who wish to build only one story in height need just as correct a foundation as those who build the highest.

Our purpose now is to offer a general introduction to the bird world of North America, and illustrate its groups by about one hundred prominent types, all so typical and so representative that every one should know them all. Herein the reader is urged to pay special attention to the systematic groups set forth. Once these are permanently fixed in the mind, the detailed study of the different species of birds becomes a genuine joy.

Learn well the various *Orders* of our birds, the prominent

Families and the prominent types representing them. Details regarding anatomy, seasonal changes, migration, breeding habits, distribution and exact food habits can be sought later on, and found in great abundance in the wealth of beautiful bird-books now available at small cost. In presenting herein the individual birds which have been chosen to represent the different groups, we shall strive to give in a few words an accurate and clearly defined general impression of each, but no more.

Remembering the Orders of Birds.—The birds of North America are divided into seventeen Orders, besides which additional Orders exist elsewhere. For the convenience of American readers the American scheme of classification is followed; but that scheme leaves out entirely many Orders of birds of the Old World. Under different circumstances, the reader might find some difficulty in remembering these Orders, and the relations they bear toward each other. In this, however, we find ourselves aided by Nature in a remarkable way.

By a very simple and natural arrangement, with fair regard to the forms and habits of birds, and their haunts upon the earth, it is possible to show upon a chart the following facts:

1. The various Orders of North American birds;
2. The relative size of each Order, in number of species;
3. The haunts of each Order, on land or water, and
4. Approximately, the rank of each order, from lowest to highest.

On the accompanying chart of bird life an ideal panorama

of land and water is divided between the various Orders of North American birds, just as we find them in Nature. By a fortunate coincidence the Orders that are lowest in the scale of natural classification are those containing the sea birds, of deep water, which therefore belong at the bottom of the chart. On the other hand, the birds that are highest in the zoological scale—the perching birds—are also the birds of the tree-tops, and must be placed at the top of the chart.

The birds of the shore, the river bank and the uplands have their respective areas in the middle portion of the scale, and we are thus enabled to see almost at a glance the geography of the bird world, at least as we find it in North America.

Beginning with the highest, we shall endeavor to point out the leading characters of the various Orders, and the examples which best represent them. Just at present, however, it is not wise for the reader to go too far into the subdivisions of the Orders, and only the most important Families will be mentioned by name.

Any reader who is unwilling to devote a few hours to learning the names and places of the various orders of birds may as well refrain from attempting to know our feathered friends; for that knowledge is quite as necessary as foundation stones are to a tall building. *The names of the Orders must be learned, and remembered!* For the purpose of making the contents of each Order familiar to the reader, representatives of the most important Families it contains will be mentioned, and illustrated by the presentation of at least one species.

EXPLANATION OF THE CHART OF THE ORDERS OF NORTH AMERICAN BIRDS

The Orders of North American birds lend themselves with gratifying readiness to the purposes of a landscape chart. In this way more than any other known to the author can the greatest number of facts regarding the Orders and their relationships be set forth in a manner easily understood, and calculated to appeal to the eye.

As with the mammals, the highest Orders are found in the tree-tops and the air; and as nearly as possible the relative sizes of the various Orders are shown. The birds of the highest and most perfect organization appear at the top of the chart, and the lowest forms are those of deep water, farthest from the land.

The great size of the Order Passeres is strikingly apparent; and it is situated in the tree-tops where its members live.

The curious shape of the Order Macrochires is due to the fact that the Goatsuckers, Swifts and Hummingbirds have so little in common that they are well-nigh separated; but the larger body—the Hummers—are closely related to the Perching Birds.

The Order Coccyges is composed of two groups equally ill matched, the Cuckoos and Kingfishers. The former touch the Perching-Birds, the latter the sharp-beaked fishers; but the association of the two in one Order is not satisfactory, and not likely to stand.

The Orders Columbae, Gallinae and Paludicolae are found on the uplands, immediately above the Limicolae, or Shore Birds.

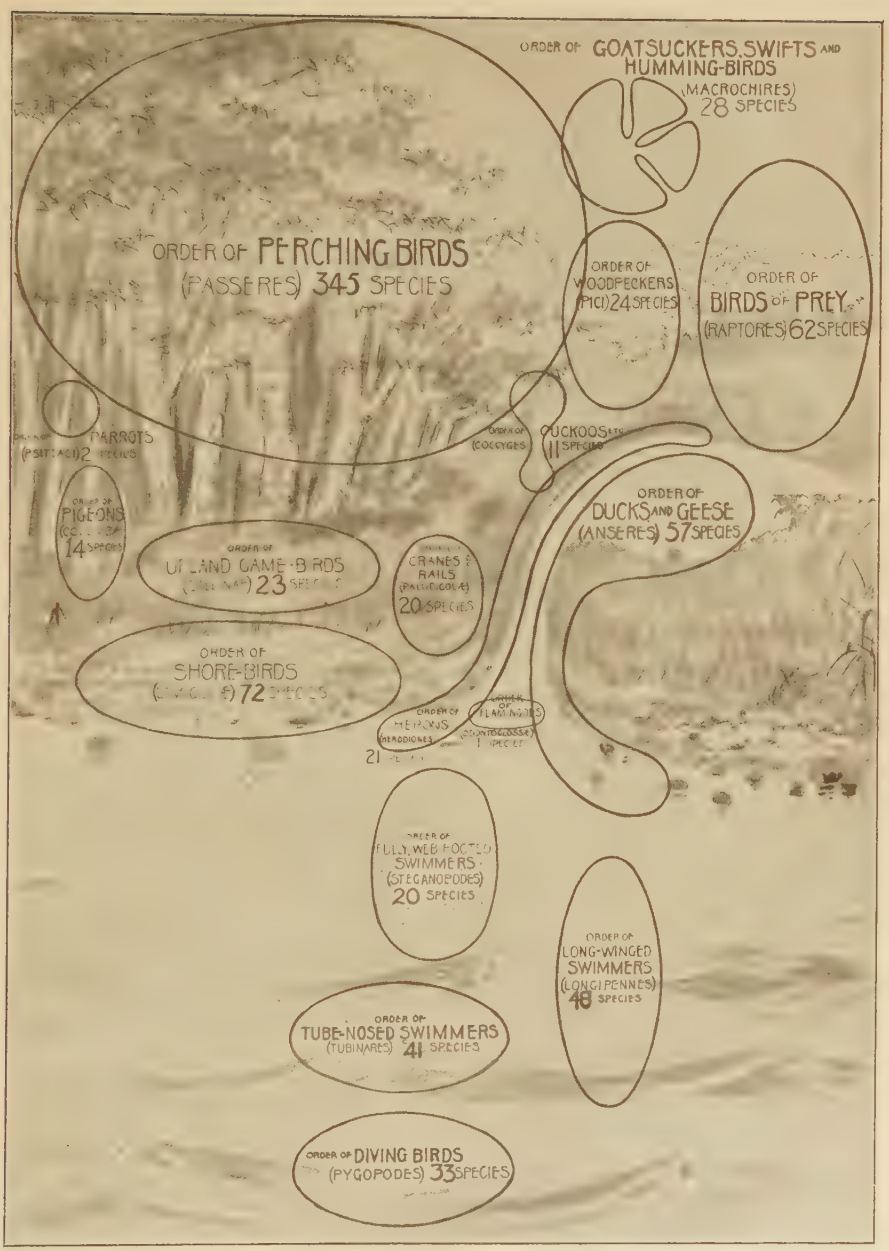
The Herodoines (Herons, Egrets and Bitterns) range along the shore from the sea, up the river, to the interior lake, while the Anseres—Ducks and Geese—cover lake, river and sea.

The Flamingo's Order—Odontoglossae—is of the shallow water of an estuary, connecting the Herons and Ducks.

The Steganopodes (Cormorants, Pelicans, etc.) prefer the shallow waters of the sea, while the Gulls and Terns (Longipennes) range from shallow to deep waters.

The Tubinares (Albatrosses, Fulmars, etc.) and Pygopodes (Auks, Murres and other weak-winged divers) are birds of deep water.

For obvious reasons, it has not been considered a practicable matter to include on a landscape chart the birds of the world, or even those of South America.


ORDER OF GOATSUCKERS, SWIFTS AND HUMMING-BIRDS (MACROCHIRES) 28 SPECIES
ORDER OF PERCHING BIRDS (PASSERES) 345 SPECIES
ORDER OF WOODPECKERS (PICI) 24 SPECIES
ORDER OF BIRDS OF PREY (RAPTORES) 62 SPECIES
PARROTS (PSITTACI) 2 SPECIES
ORDER OF (COCCYGES)
CUCKOOS ETC. 11 SPECIES
ORDER OF PIGEONS (GE... 3) 14 SPECIES
ORDER OF DUCKS AND GEESE (ANSERES) 57 SPECIES
ORDER OF UPLAND GAME-BIRDS (...) 23 SPECIES
CRANES & RAILS (PALUDICOLÆ) 20 SPECIES
ORDER OF SHORE-BIRDS (...) 72 SPECIES
ORDER OF HERONS (HERODIONES) 21
ORDER OF FLAMINGOES (...) 1 SPECIES
ORDER OF FULL-WEB-FOOTED SWIMMERS (STEGANOPODES) 20 SPECIES
ORDER OF LONG-WINGED SWIMMERS (LONGIPENNES) 48 SPECIES
ORDER OF TUBE-NOSED SWIMMERS (TUBINARES) 41 SPECIES
ORDER OF DIVING BIRDS (PYGOPODES) 33 SPECIES

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LANDSCAPE CHART OF THE ORDERS OF NORTH AMERICAN BIRDS.

The Orders of Living Birds

OMITTING NINE ORDERS OF THE OLD WORLD AND SOUTH AMERICA

ORDER	PRONUNCIATION	CHARACTER OF BIRDS INCLUDED	EXAMPLES
Passeres	*Pas'se-rez*	Perching Birds	Robin, Warbler and Jay.
Macrochires	*Mac-ro-chi'rez*	Goatsuckers, Swifts and Humming-birds	Nighthawk, Swift, Ruby-Throat.
Psittaci	*Sit'ta-si*	Parrots and Macaws	Carolina Parakeet, Macaw.
Pici	*Pi'si*	Woodpeckers	Golden-Winged Woodpecker.
Coccyges	*Coc'si-gez*	Cuckoos and Kingfishers	Belted Kingfisher, Cuckoo.
Raptores	*Rap-to'rez*	Birds of Prey	Eagle, Owl and Vulture.
Columbae	*Co-lum'be*	Pigeons and Doves	Band-Tailed Pigeon, Mourning Dove.
Gallinae	*Gal-li'ne*	Scratching Birds	Quail, Grouse, Wild Turkey.
Limicolae	*Li-mic'o-le*	Shore Birds	Plover, Woodcock, Snipe.
Paludicolae	*Pal-u-dik'o-le*	Cranes and Rails	Whooping Crane, Virginia Rail.
Herodiones	*Her-o-de-o'nez*	Herons and Egrets	Great Blue Heron, Snowy Egret.
Odontoglossae	*O-don-to-glos'se*	Flamingoes	American Flamingo.
Anseres	*An'se-rez*	Swimmers with Comb-Edge Bills	Mallard, Canada Goose, Swan.
Steganopodes	*Steg-a-nop'o-dez*	Fully-Webbed Swimmers	Pelican, Darter, Cormorant.
Tubinares	*Tu-bi-na'rez*	Tube-Nosed Swimmers	Albatross.
Longipennes	*Lon-gi-pen'nez*	Long-Winged Swimmers	Gull and Tern.
Pygopodes	*Py-gop'o-dez*	Diving Birds	Loon, Grebe, Auk, Murre.
Impennes	*Im-pen'-ez*	Flightless Divers	Penguin.
Ratitae	*Ra-ti'te*	Flightless Runners	Ostrich, Cassowary.

CHAPTER XIX

ORDER OF PERCHERS AND SINGERS

PASSERES

THIS Order is the highest in the scale of birds, and it is by far the largest of the nineteen Orders treated here. In the zone of agriculture it contains the birds which are of the greatest importance to mankind, the insect-eaters. It also contains all the real song-birds of the world, and its North American Families are as shown below:

ORDER PASSERES

FAMILIES	SCIENTIFIC NAMES	EXAMPLES
THRUSHES	*Tur'di-dae*	Robin, Thrush, Bluebird.
KINGLETS	*Syl-vi'i-dae*	Kinglet and Gnatcatcher.
NUTHATCHES	*Pa'ri-dae*	Nuthatch, Chickadee, Titmouse.
TREE CREEPERS	*Cer-thi'i-dae*	Brown Creeper.
DIPPERS	*Cin'cli-dae*	Water Ouzel.
WRENS	*Tro-glo-dy'ti-dae*	Wren, Catbird, Mockingbird, Thrasher.
WAGTAILS	*Mot-a-cil'li-dae*	Wagtail and Pipit.
WARBLERS	*Mni-o-til'ti-dae*	Warbler, Water Thrush, Redstart, Chat.
VIREOS	*Vi-re-on'i-dae*	Red-Eyed Vireo.
SHRIKES	*Lan-i'i-dae*	Butcher Bird and Loggerhead Shrike.
WAXWINGS	*Am-pel'i-dae*	Bohemian Waxwing, Cedar Bird.
SWALLOWS	*Hi'run-din'i-dae*	Swallow and Martin.
TANAGERS	*Tan-a-gri'dae*	Scarlet Tanager.
FINCHES	*Frin-gil'li-dae*	Sparrow, Finch, Grosbeak, Cardinal, Snow Bunting, Redpoll.

FAMILIES	SCIENTIFIC NAMES	EXAMPLES
BLACKBIRDS	*Ic-ter'i-dae*	Blackbird, Oriole, Meadowlark, Bobolink.
CROWS	*Cor'vi-dae*	Crow, Raven, Jay, Nutcracker.
HORNED LARKS	*A-lau'di-dae*	Horned Lark.
FLYCATCHERS	*Ty-ran'ni-dae*	Flycatcher, Pewee, Phoebe, Kingbird.

The majority of perchers are birds of plain feather, quite as if Nature had intended that these, the best friends of the farmer and fruit-grower, should be the last to be destroyed by the merciless Man-with-a-Gun.

It will be a sad day for the American farmer when the last insect-eating bird of our country is brought fluttering and lifeless to the ground. When the armies of destroying insects begin to multiply unchecked, and send forth their millions and tens of millions, then will the husbandman realize the value of the allies he has lost, and vainly wish to exchange any number of grapes and cherries for the once-despised robin, thrush and blackbird.

Quite apart from their cash value to the agriculturist, it is the song-birds that appeal most strongly to the ear and heart of man. Even the exquisite plumage of the resplendent trogon, most beautiful of all American birds, does not thrill the soul as does the song of the robin, the brown thrasher and the mockingbird. Next to sunshine and green verdure, the most cheering thing in Nature is the song of a bird. At this moment (early spring) a robin, in the big maple in front of my windows, is pouring forth a song that is at once restful and inspiring. It reminds me that we who live in the temperate zone are *greatly favored* by the presence in our bird-life of the sweetest singers in the world. Shall we, then, be

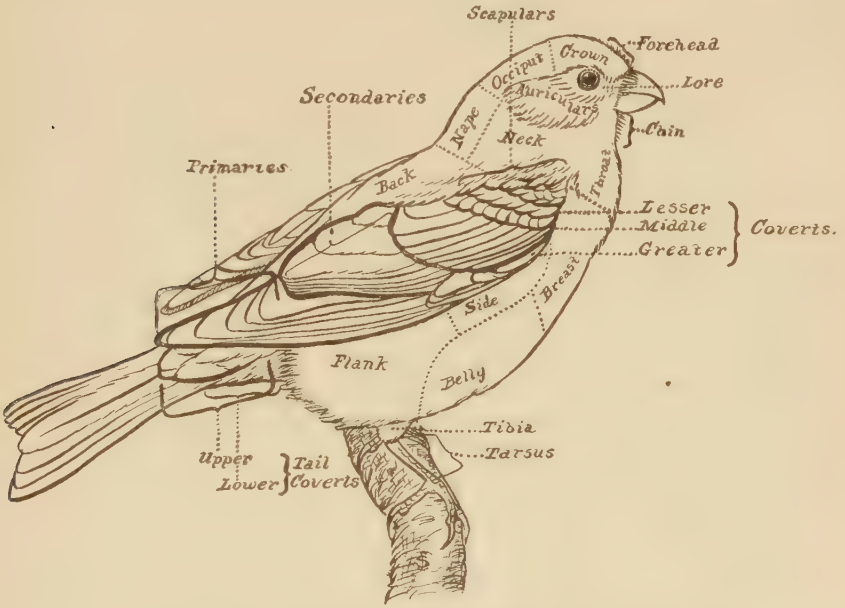
so utterly barbarous and mean as to engage in, or permit, the killing of our song-birds in order that they be used either as food for biped pigs, or to adorn (?) the cheap millinery of servant-girls? Never!

Let it not be thought, however, that the Order Passeres has not a good share of birds of beautiful plumage. In our own fields and forests, behold the waxwing, the oriole, the cardinal, the tanager, the grosbeak, the magpie, the jay and the bobolink. The tropics contain the wonderful birds of paradise, and a bewildering array of hummingbirds, cotingas, finches, ground thrushes and many others.

If the temperate zone lacks anything in perching birds of brilliant plumage, that lack is more than made up by the singing birds. With all its wealth of bird life, brilliant and plain, the tropics are generally silent, and a joyous or musical bird song is rarely heard. Of the bird cries that one occasionally hears, the majority are harsh and unpleasant squawks. The tropical day has neither robin nor mockingbird, the night no whippoorwill. True, there is the awful "brain-fever" bird of the Indian night, but it is neither musical nor joyous. One may spend months in the tropics, both of America and of the Far East, and in all that time hear less of real bird song than can be heard on many an American farm in one day.

As might be expected in a large Order of birds, the food habits of the perchers cover a wide variety of foods. The great majority prefer to live upon insects, and the young of all species are absolutely dependent upon soft-bodied insects, larvae and earthworms. Many birds are really limited to

insect food, and can subsist on no other kind. Next in importance, and for the longest period, perhaps, come seeds and grain, especially the seeds of weeds that are a pest to the farmer. As a rule, fruit is taken in its brief season more as a dessert than as a staff of life.



THE PARTS AND PLUMAGE OF A PERCHING BIRD.

A very few species, like the crow, magpie and jay, eat meat whenever opportunity offers it, and welcome the discovery of raw meat or eggs.

The great value of the perching birds lies in the enormous quantities of insects which they consume as food.[1] These

[1] The Biological Survey of the United States Department of Agriculture has published many important bulletins and short papers on the food habits of our birds, with especial reference to the species either most beneficial or most harmful to the farmer and fruit-grower. A list of those now available, and the terms on which they are procurable, will be furnished by the Department upon application.

birds have been specially developed by Nature to combat and destroy the hordes of insects destructive to fruit, grain and tree life, which otherwise would in a short time increase to such enormous numbers that no vegetation could withstand their attacks.

To the average reader, the Order of Perching and Singing Birds may at first seem difficult to grasp; but in reality it is not. A knowledge of forty birds will give one a very good idea of its various Families; and any one can learn about forty birds. After this Order has been mastered, all others will be found quite easy. The examples introduced have been selected with great care, and, concerning those illustrated, the pictures will tell of their forms and markings far better than wordy descriptions could do.

THE THRUSH FAMILY

Turdidae

The Robin.[1]—All lovers of birds should agree in placing this dear old friend at the head of the list of the birds of this continent. This is because it is the highest avian type. It has typical plumage, it flies well, it perches, it sings beautifully, it migrates, and its anatomy is thoroughly representative. Moreover, it quickly discerns a friend and protector, and it is not driven away by the English sparrow.

Of all our birds, the Robin comes the nearest to being "folks." It is always one of the first birds to arrive in the spring, it remains all summer, and it is one of the last to de-

[1] *Me-ru'la mi-gra-to'ri-a.* Length, from end of beak to end of tail, 9 to 10 inches.

part at the approach of winter. Often the late spring snows catch it on its early migration, and its staying powers are put to the test. It is a good plan to scatter food for these early birds. Nothing save the sun itself is more gladdening on a raw March day than the joyous note by which the Robin announces the arrival of himself and spring.

Who is there who can know the Robin and not love him? Few, indeed; and those persons around New York and in some parts of the South who shoot Robins for food are wholly unfit to inhabit the Robin's country, unless they reform.[1]

ROBIN.

The Robin is one of the sweetest and most joyous songsters I know. As well try to describe the glories of a sunset as to set forth in words the liquid melody, clear and sweet, which pours from his throat when he feels particularly joyous.

Everywhere the Robin is a very sociable bird, and exceeding quick to distinguish a friend from a foe. Give it

[1] "In central Tennessee are large tracts of cedars, the berries of which serve to attract myriads of Robins in the winter. One small hamlet in this district sends to market annually enough Robins to return $500, *at five cents per dozen*, equal to 120,000 birds." They are killed at night by torchlight, with sticks. An officer of the Louisiana Audubon Society states that a conservative estimate of the number annually killed in Louisiana for food purposes is a *quarter of a million* when they are usually plentiful.—*William Dutcher, in Educational Leaflet No. 4, of the National Association of Audubon Societies.*

absolute protection, and security from cats, and it will cheerfully nest on your window-sill. This is what one actually did in Buffalo, under our roof—built her nest on the sill of an upper window, close against the glass, and reared her brood there. We went many times to see how she was getting on, and she, knowing well that glass is a barrier, permitted us to put our faces within two inches of her head.

In the Zoological Park, the Robins were the first wild creatures to learn, in 1900, that the reign of the poacher was over; and they quickly told it to the crows, and thrushes, and other birds. In an eight-foot pine-tree, that was planted six feet from the edge of the main walk, and directly in front of our headquarters, a Robin built her nest, only five feet from the ground; and there she reared her young. To many visitors who loved birds, her nest was shown, but to Robin-killers and the nest-robbers no one said a word. On Gardiner's Island, where cats live not, the Robins nest on fence-rails only two feet from the ground, in full view of the bird-loving inhabitants of that small world.

Often we have been greatly interested by the keenness of sight of the Robins which visit our lawn. After every shower, certain Robins of our acquaintance take possession of the lawn, and stride over the grass with an air of great importance and earnestness of purpose. After several wise and sidewise cocks of the head, a Robin will suddenly drive his bill far down into the grass, and brace himself for a hard struggle. By dint of many hard tugs, out comes the earthworm, to be borne away in triumph to a certain nest. Often I have tried to see worms down among the roots of the grass, as the Robins

do, but never once have I succeeded. Evidently my objectives never were focussed just right for worms in green grass.

The enactment of the federal migratory bird law now will enable the Government to stop the slaughter of Robins in the South for food, but in the North we must watch sharply and continuously to guard our Robins from the alien killers and eaters of song-birds that have come to us from Europe.

In the "grape belt" of western New York, Robins are a great annoyance to some grape-growers because of the bunches they disfigure. Elsewhere they are of great benefit to farmers, and the few cherries they take in cherry-time are very modest compensation for the noxious grubs they pick out of the freshly ploughed fields.

The investigations of the Biological Survey of the Department of Agriculture have demonstrated the great economic value of the Robin as a destroyer of harmful insects. The contents of three hundred and thirty stomachs of birds taken in all seasons revealed the fact that, in the course of the entire year, insects make up 40 per cent of the food of Robins, wild fruit 43 per cent, cultivated fruit 8 per cent, and miscellaneous vegetable food 5 per cent.

Regarding the killing of Robins, and other song-birds, and also doves, as food for man in a land of plenty, there cannot be two opinions. It is not necessary; it is not "sport"; it is very injurious to our farmers and fruit-growers, and entirely reprehensible. No self-respecting boy or man can be guilty of such wrong-doing; no civilized community should tolerate it for one moment, and *no farmer can afford to permit it!* I would rather that any friend of mine should be caught

stealing a sheep than killing Robins, either for food or "sport."

Let us protect the great American Robin, *and all other perching birds*, even at the point of the bayonet if it be necessary.

The Wood Thrush[1] is one-fifth smaller than a robin, and is easily recognized anywhere by its beautifully spotted breast. It has about fifty dark-brown spots, often arranged in rows up and down its breast, belly and throat, on a creamy-white ground-color. Other thrushes have dark spots on the breast, but not down to the legs. The head and shoulders of this bird are of a bright cinnamon color.

WOOD THRUSH.

This graceful creature often works overtime to make the woods melodious, and it is one of our sweetest singers. It is not so bold and confident as the robin, and is much given to following the robin's lead. Its favorite haunt is the sweet seclusion of shady woods and thickets, where the half-bare earth affords good hunting-grounds, and a fair degree of safety from observation. Its nesting habits are very much like those of the robin, and its range includes the whole eastern half of the United States, to the Great Plains beyond the Mississippi.

[1] *Hy-lo-ci'chla mus-tel-i'na.* Length, 8 inches.

THE COMMON BLUEBIRD.[1] —The United States is a country of such vast extent, it is a physical mosaic of different elevations, soils and climates. Roughly speaking, these are its physical divisions:

1. The *eastern half*, of ideal rainfall, bountiful harvests and abundant shade.

2. The *Great Plains*, fine for grazing, but mostly too dry for agriculture.

3. The *Rocky Mountain region*, embracing a perfect medley of physical conditions, mostly high, rugged and rather lacking in insect life.

4. The *arid regions* of the country between the Rockies and Sierra Nevadas, extending from southern Washington to the City of Mexico, and including southern California.

5. The *region of great rainfall*, on the northwestern Pacific coast (northern California, Oregon and Washington).

It is not strange, therefore, that we find typical species of eastern animals developing westward into different colors, and also different pelage, and designated scientifically by different names. Take these examples by way of illustration:

In the East we have the *Common Bluebird.*

In the Rockies we have the *Chestnut-Backed Bluebird*, and also the *Mountain Bluebird.*

In Arizona we have the *Azure Bluebird.*

In the Pacific states we have the *Western Bluebird.*

And in Lower California the *San Pedro Bluebird.*

Is it at all necessary that the general reader should know

[1] *Si-a'li-a si-a'lis.* Length, 6.75 inches.

about all these different species in order to not be accounted ignorant? Let us see.

Any sensible civilized person knows a cow at sight, also something of its place in Nature, and its habits. No one,

BLUEBIRD.

however, save the special student of domestic cattle, is expected to be able to say, without "looking it up," whether a particular cow is an Alderney, a Jersey, a Short-Horn, a Hereford, or a Durham.

The case of the Bluebird is quite similar. He who knows one Bluebird well may justly claim a bowing acquaintance with all the others, and feel at home when in their company.

Here in the East the Bluebird is a thing of beauty, and a

joy until the abominable English sparrows drive it away. It comes with the robin, to help chase winter away; and, though we have heard it a hundred times, it is always welcome news, late in February or early in March, to hear some one say

RUBY-CROWNED KINGLET.

triumphantly, "I saw a Bluebird to-day!" It is as needless to describe this feathered beauty, with the brown breast, and back of heaven's bluest sky-tint, as it would be to describe a rainbow.

Unfortunately, the Bluebirds are not good fighters, and the English sparrows harry them shamefully. They are

timid, and easily driven away. Worse than this, they are easily killed by cold weather. The cold wave which visited the South in 1895 killed so many thousands of Bluebirds, especially in North Carolina and Arkansas, that for some time afterward the number visible in the North was alarmingly small. If not molested by the English sparrow, the Bluebird takes readily to boxes erected on poles near farmhouses, similar to those frequently erected by the farmer boys to attract the purple martin. A good way to encourage robins and Bluebirds is to kill the English sparrows.

THE KINGLET FAMILY

Sylvidae

The Ruby-Crowned Kinglet[1] is one of our smallest birds, and it is easily recognized by the tiny tuft of ruby-red feathers on the crown of its head. In life it is a dainty little feathered gem, but it is so modest and retiring that it is seen only by sharp eyes. "Kinglet" means "Little King." Mrs. Mabel Osgood Wright testifies strongly to its value as an insect-destroyer, especially in the late autumn, when other insectivorous birds have gone, when it works industriously upon the trunks of evergreens. Dr. Coues considered the Kinglet an exquisite singer, but I must confess that its vocal powers have quite escaped me.

THE NUTHATCH AND TITMOUSE FAMILY

Paridae

The birds of this Family deserve to rank as prime favorites. They remain with us through "the long and dreary

[1] *Reg'u-lus cal-en-du'la.* Length, 4.25 inches.

winter," when all save a corporal's squad of the grand army of birds have fled southward, and left us to our fate. They are exceedingly industrious, and their efforts are directed against insects of very destructive habits, the tree-borer and

CHICKADEE.

the bark-louse. In their work they are not continually "playing to the gallery," and telling people how busy they are.

The Chickadee, or Black-Capped Titmouse,[1] is one of the dearest little fellows that flies. It always reminds me of a forest elf, in a black cap and a feather cloak. Instead of making a great show of fright, like a girl in the presence of a

[1] *Pa'rus at-ri-cap'il-lus.* Length, 5.25 inches.

ferocious mouse, little Black-Cap perches on a tiny twig growing low down on the trunk of a big tree, and cocks his head at you, while he looks you over with a fraternizing air. His attitude and manner say as plainly as English: "You are a good fellow, and I'm another. We understand each other perfectly, don't we?"

And then his greeting. If you have never before had the pleasure of meeting him, he pipes out cheerily, "CHICK-a-dee-dee-*dee!*" Watch for him the next time you go into the woods in winter—a jet-black cap with a white waistcoat below it; a black necktie, bluish-gray overcoat, and a very pert and saucy air. You can hardly fail to recognize him, but in case you hesitate, and think his "face is familiar," he will up and tell you his name, as plainly as print.

Six well-marked types and several races of Chickadees inhabit North America from Alaska to Mexico, but the one most widely known is that just named.

THE WHITE-BREASTED NUTHATCH[1] deserves the most perfect protection and encouragement that the people of this country know how to offer. One good look at this bird on the trunk of a valuable tree, searching as if with a magnifying-glass for the trees' deadly enemies—the borers—ought to convert any person to the cause of bird-protection. Like the chickadee, the Nuthatch remains in the North all winter, because he feels that he has not a moment to lose in his war on the borers.

The tree-trunks are his favorite hunting-ground, and he goes over them, literally inch by inch. He becomes so ab-

[1] *Sit'ta carolinensis.* Length, about 6 inches.

sorbed in his work that he forgets all about himself, and works half the time head downward, or oblique, or horizontal, as it may happen to be. Rarely does he stop to talk, and even then he only clucks in his throat, "not necessarily for publication, but as a guarantee of good faith."

WHITE-BREASTED NUTHATCH.

Often in the silent and snowy woods, when your feet go *rip! rip! rip!* through the frozen crust, you hear close overhead a scratching, digging sound, as of some one gouging into rough bark with a pocket-knife. Look up, and it will be a Nuthatch, working away as if his job depended upon the doing of a daily stint. He thinks that in his case it is the late bird that catches the worm! His beak is like that of a

small woodpecker, and although his friend the chickadee has more style than he, he himself is much better fitted for digging in bark. The top of his head is black, his sides, throat and breast are pure white, while his back is dull blue, or gray-blue. As a climber, this bird surpasses the woodpecker, because in clinging to a tree-trunk it makes no use of its tail.

Nuthatches are easily encouraged to make your trees their headquarters. In December, nail to a tree-trunk here and there, about twelve feet from the ground, some lumps of suet, or fat pork on the rind, or beef bones with a little raw meat upon them, and see how quickly the birds find them out. The "winter residents" will feast upon them until the last morsel has disappeared, and they will appreciate your thoughtfulness thus displayed precisely when tree-borers burrow deepest, and are most difficult to get at.

THE TREE-CREEPER FAMILY

Certhiidae

The Brown Creeper[1] represents a small Family of small birds of tree-climbing habits, but with bills that are rather too slender for work in bark. They are not fitted by nature for digging a modest and retiring borer from the bottom of his tunnel, and therefore they make a specialty of bark-lice and other surface wood-workers which can be picked off without hard digging.

As an example of protective coloration, this little creature is worthy of special note. Its back is brown, marked by

[1] *Cer'thi-a fa-mil-i-ar'is americanus.* Length, 5.5 inches.

about twelve broad stripes of dull gray, and between the two colors the striations of bark are surprisingly well imitated. On the side of an oak, or elm, or chestnut, this little bird is almost invisible until it moves. It does not work head down-

BROWN CREEPER.

ward, like the nuthatch, but creeps about with its head up, braced by its tail, like a woodpecker. Like both the preceding species, it is a winter resident, and in fact is not much in evidence at any other season. The four species of this group cover the United States, and extend from Alaska to Guatemala.

THE WRENS AND CATBIRDS

Troglodytidae

In some respects, the wrens are but a short step from the tree-creepers, but in others they are widely apart. For its size the House Wren[1] is the most pert and saucy bird in North America. Forty years ago a pair of these merry little sprites took up their abode in the wild fastnesses of the grape arbor that sheltered our well; and I can hear their shrill chatter yet. It was like the piping of a piccolo. For eight years they and their children and grandchildren possessed the outskirts of our dwelling, and it was a great day when we discovered a beautiful, feather-lined nest, nearly six inches deep, that the Wrens had built in an old-fashioned lantern that hung in the wood-house. I wish it were possible to have Wrens around a city dwelling, or in a Zoological Park.

A Wren is known by the way it carries its tail, so very straight up in the air that sometimes it tilts forward. The House Wren is the most sociable of all our wild birds, and also the one most confident of its place in the hearts of its countrymen. I never knew of a Wren being killed by any one save a collector of bird-skins. As for myself, I would go Wrenless forever rather than take the life of a creature so winsome and trustful. Even the cats of our household used to respect the family Wrens. In the country, where there are no English sparrows, it is easy to attract these interesting birds by putting up nesting-boxes for them. Five species

[1] *Tro-glo-dy'tes ae'don.* Length, 4.75 to 5.25 inches.

of Wrens occupy the United States, from ocean to ocean, the Pacific species, west of the Rockies, being the *Tulè Wren*.

HOUSE WREN.

THE BROWN THRASHER.[1]—Vocally this bird is practically the northern understudy of the mockingbird. When, after a warm spring shower and a sudden burst of sunshine, an able-bodied Brown Thrasher perches on the tip-top of a red-haw bush, and for fifteen minutes pours forth a steady stream

[1] *Har-po-rhyn'chus ru'fus.* Length, 11.25 inches.

of delicious melody, in bewildering variations, one is tempted to declare that no mockingbird can surpass it. It is simply indescribable. Often when sadly toiling in Iowa fields, I have been stopped and held by this feathered spellbinder for what seemed to my brothers like very long intervals.

In form this bird is very much like the mockingbird, but its back is colored a rich iron-rust brown, and its under surface is dull white, strongly spotted with large, triangular brown spots. Its home is the whole of the United States east of the Rocky Mountains, and it is the sweetest singer of the North. Unfortunately, its song period is rather short, and terminates about the end of June.

The Catbird[1] of the North bears a strong resemblance to the mockingbird, in form, color and movement. It is also a good singer, though hardly in the same class as its southern relative. It is very sociable in its habits, and loves the orchards, gardens, fruit trees and berry bushes of the country dweller. Its name is derived from its favorite exclamatory cry, which sounds like the plaintive mew of a half-grown kitten. Its prevailing color is dark slaty-gray.

The Mockingbird,[2] of the states south of the Ohio River, is a singing wonder. It is a little bundle of nerves, covered with modest drab feathers, and its throat is tuned up to concert pitch. When it is silent it can be recognized by its slender body, long legs and long tail; but when it is singing only a deaf man needs an introduction. This bird can also be recognized by its nervous and irregular move-

[1] *Gal-e-os-cop'tes carolinensis.* Length, 8.75 inches.
[2] *Mi'mus pol-y-glot'tos.* Length, about 10 inches.

ments, hopping and darting about, up, down and sidewise. If the Mocker feels well, he sings as he darts about, as jerkily and impulsively as he moves.

The Mockingbird loves to sing almost as well as some persons love to hear him. His typical song is a bewildering

CATBIRD.

medley of warbling, chirping and twittering, many passages being very clever imitations of other birds, but the majority of it is improvised for the occasion. Next to the marvellous variety of his vocal exercises are the clearness and sweetness of his notes; for this singer never sharps or flats. The amount and variety of the melody that come from that insignificant little gray midget in feathers are truly marvellous. Every person who has heard the free, wild bird performing in its home thicket knows that the singing of caged specimens is but a spiritless imitation of the wild song.

Strange to say, this bird not only sings in the daytime, but there are periods, especially during the breeding season, when the male sings at night.

As usual, man's destructiveness reaches out for this the greatest of all American singers. Thousands of nestlings are caged, the majority of them in Louisiana. Those that do not die in the process of rearing live for brief periods in wretched little 12 by 14 inch cages, and die without having known one happy, joyous hour. It is reported that in most portions of the South the Mockingbirds are rapidly decreasing in number, especially in Arkansas. The killing of a bird of this species, on any pretext, should be made a penal offence.

THE DIPPER FAMILY

Cinclidae

The Water Ouzel, or Dipper,[1] is one of the most remarkable little birds on this continent. It is a genuine water elf, and the things it can do are almost beyond belief. I first saw it in late November, on the strip of ice which fringed the edge of the roaring, swirling, icy-cold water which plunges into the Shoshone Canyon at the forks of the Shoshone River. Man or beast stepping into that foaming torrent would have been crushed against the rocks, and drowned at the same moment—two deaths in one. In that grim and terrible solitude, fast in the embrace of early winter, we saw on the snow-white brink of the ice-bank a tiny dark object, which closer inspection revealed to be a bird. It looked like a large gray wren.

[1] *Cin'clus mex-i-can'us.* Length, about 8 inches.

As we paused to regard it, it blithely flew down into midstream, and dived head foremost into a chilly wave that ran ten miles an hour. An instant later it reappeared, all unruffled and unwet, blithely flew back to the edge of the ice

MOCKINGBIRD.

and alighted once more. Then we knew well what it was; for it could be nothing else than the Water Ouzel. Afterward we saw others along the line of the Denver & Rio Grande Railway, where it winds its way through the Rocky Mountains. Where the walls of the Royal Gorge almost crowd the train into the Arkansas River is a good place to watch for them.

This bird is a *diving thrush!* Nature has fitted it to dive boldly into the coldest and most turbulent water, or through a water-fall, and even to walk on the bottom of a still pool in search of food, without being at all disturbed. Both in form and size this little creature is like a large wren, but it is so peculiar it occupies a genus quite alone. Of course it is not web-footed; and in appearance it exhibits not one feature suggestive of a semi-aquatic life. Its home is along the foaming torrents of the Rocky Mountains, and Sierra Nevadas, from Alaska to Guatemala. It nests close beside swift-running streams, sometimes beside or even behind a cascade. It is known that this strange bird gives forth a song both clear and sweet, but I have never seen one elsewhere than near a roaring torrent, where no ordinary bird song could be heard.

THE WARBLER FAMILY

Mniotiltidae

From the middle of April to the middle of September the woods and thickets of the northern states are inhabited by a very considerable number of tiny bird forms. They are trim-built little creatures, quiet and businesslike, and they take themselves very seriously. A few of them are clad in refined shades of yellow, but—most fortunately—the great majority wear dull olive, gray or brown colors, and thereby escape the hostile attention that bright plumage always attracts.

These are the warblers, very useful in the destruction of insects, but the most elusive and difficult little creatures with which bird students have to deal.

The high-water mark in insect destruction by our birds is

reached by the flycatchers—small, modest-mannered little creatures that do their work so quietly you hardly notice them. All you see in your tall tree-tops is a three-foot flit or glide, now here, now there, as the foliage is literally combed of its insect-life. Bulletin No. 44 of the Department of Agriculture gives the residuum of an exhausting examination of 3,398 warbler stomachs, from seventeen species of birds, and the result is: 94.99 per cent of insect food—mostly destructive insects, too—and 5.01 per cent of vegetable food. What more can any farmer or forester ask of the tree-protectors than that!

The difficulty in studying warblers lies in cultivating them effectively without killing them. As for myself, I have not yet seen the day wherein I could find myself willing to slaughter from five hundred to a thousand of these exquisite little creatures for the sake of becoming sufficiently acquainted with them to name them *when they are dead!* I blush not in admitting that I have gone half way through life knowing less than a score of warblers to the point of naming them, accurately, as they fly before me. My exhortation to all young people is—*do not slaughter birds, of any kind, merely to become acquainted with their names.* Some of the wild flowers can endure that method without extermination, but the wild birds and mammals can not.

It is *not at all essential* that such tiny, inconspicuous creatures as warblers should be recognized and correctly named at sight. Already a million warblers have died to make holidays for collectors. Not long since I received from an egg-dealer a circular advertising the following eggs for sale:

Worm-Eating Warbler	84 sets,	416 eggs.
Yellow Warbler	94 "	388 "
Oven-Bird	105 "	458 "
Yellow-Breasted Chat	139 "	521 "
Kentucky Warbler	210 "	917 "
Total for 51 species	1,274 sets,	5,433 eggs.

It is such wanton destruction as this which makes me "down" on egg-collecting. It is safe to say that the taking of those 5,433 warbler eggs robbed the farms and forests of New York state of that number of useful birds, not counting possible progeny, and did not do one dollar's worth of good to the "cause of science" or any other public interest. Already poor "science" has an awful load of crimes against nature to answer for. Do not add to it without very strong justification.

The members of the Warbler Family, commonly called wood warblers, are distributed all over North America, wherever insects abound, from the southern edge of the Arctic Barren Grounds to southern Mexico. In her very useful book, entitled "Birds of the Western United States," Mrs. Florence Merriam Bailey enumerates forty species; and Mr. Frank M. Chapman, in his "Birds of Eastern North America," gives fifty-two. Of these, however, twenty-one are duplicated, and therefore the whole number of warblers described in the two handbooks is seventy-one. When we consider the fact that about sixty of those species are very small birds, of uniform size, and many of them quite unmarked by striking special colors, the difficulty of becoming acquainted with the different species will begin to appear. For present purposes, the whole Family can be very fairly

represented by three species. Two of them are of universal distribution, and the third (the chat) is nearly so.

The Yellow Warbler, or Summer Yellow-Bird,[1] is chosen as the type of about sixty species of small wood warblers each of which is called "warbler" with a descriptive name

YELLOW WARBLER.

prefixed, such as palm warbler, prairie warbler, Calaveras warbler, etc. It is of a bright, greenish-yellow color, and is easily recognized on the wing. On the western prairie farms the boys call it a "Wild Canary," because it strongly resembles the orange-yellow phases of that popular cage bird. As if courting acquaintance with man, it loves to frequent the roadside thickets, the edges of woods, and even the orchard and garden.

[1] *Den-dro'i-ca aes'ti-va.* Length, 5 inches.

The beauty of this bird far surpasses its minstrelsy, for it is but an indifferent singer. The fact is, however, that it has so much work to do in catching insects it has little time for music; for it will be noticed throughout the bird world that the most diligent insect-catchers are not in the habit of singing over their work. This is due to the same reason that a good deer-hunter does not talk and tell stories while following a trail.

The Yellow Warbler ranges from the Atlantic to the Pacific, and over practically the whole of North America save the arctic barrens, Alaska, and our arid southwestern states. Mrs. Mabel Osgood Wright says: "It is one of the particular victims which the cow blackbird selects to foster its random eggs, but the warbler puts its intelligence effectively to work, and sometimes builds a floor over the unwelcome egg." (*Birdcraft*, p. 95.)

The Yellow-Breasted Chat[1] is much larger than the typical wood warblers, being 7¼ inches long to their 5 or 5½ inches. It has an olive-green back and a sulphur-yellow breast and throat, with a white line extending from its beak above and around its eye. By these colors, and its erect tail, it may easily be recognized. It is a very pert and saucy bird, and much given to frequenting the haunts of country dwellers.

The Chat is not a great singer. He has no regular song, and the notes he utters are jerky, erratic and elusive. Its voice has some peculiar quality which renders this bird very difficult to locate by sound alone. Many times I have been completely misled by its call notes coming from a thicket,

[1] *Ic-te'ria vi'rens.* Length, 7.25 inches.

and finally found the bird yards away from the spot whence its go-as-you-please voice seemed to come.

"A Chat courtship," says Mr. A. C. Webb, in "Some Birds, and their Ways," "is a sight never to be forgotten. In the spring, when birds begin housekeeping, the male Chat charms himself and his mate by some remarkable performances in the air. Launching himself from the top of some tall tree, he flutters from side to side, flirts his tail, stops, stands on his head, dangles his legs as if they were broken, turns somersaults, and makes a monkey of himself generally, as he descends to the thicket below, where his mate is perched among the briers. Sometimes he starts from the low bushes and rises almost straight up into the air until he is above the tree-tops. He chatters and screams as he goes, telling her to watch him now as he comes down, and see if in all her life she ever saw a bird that could do such wonderful feats. No doubt to her eyes he is the picture of grace and elegance as he performs on his flying trapeze, but to us his clownlike antics seem ridiculous."

The Chat of the East is represented in the Far West by a long-tailed variety, and between the two their range covers nearly the whole of the United States, British Columbia and Mexico.

The American Redstart[1] looks like a small, pinkish-yellow understudy of the Baltimore oriole, 5½ inches long. Its colors and color pattern are very similar to those of our old friend of the elm trees, velvety black on the back and head, reddish orange on the sides and breast and white on the

[1] *Se-toph'a-ga ru-ti-cil'la.* Length, 5.50 inches.

belly. The tail is orange and black, and the colors are very prettily disposed. In its flight you can recognize it by its flashes of fiery red.

On the whole, this bird has (in my estimation) the most beautiful color pattern to be found in all our long procession of warblers and ground thrushes. The female is so different in color it is at first difficult to believe her of the same species. Her body colors are brownish olive above with sides of pale yellow, and the head is gray instead of black.

This beautiful bird is to be looked for all over North America from Labrador and Fort Simpson to northern South America. In the North it arrives in May, and abides until September.

The Water Thrushes.—Beginners in bird-study are warned to note the fact that in the Warbler Family are several birds called "*Water Thrushes*," which do *not* belong to the Thrush Family. It is a pity that they have not been distinguished by some other name. There are two species, the Common Water Thrush[1] and the Louisiana Water Thrush,[2] the first a northern, the latter a southern, bird. Both live in the dark recesses of virgin forests, where clear brooks gurgle over mossy stones, between fern-covered banks. They are watchful and suspicious, but when flushed they do not immediately fly beyond gunshot, as nowadays every bird should do. The Louisiana Water Thrush strongly resembles the wood thrush, but is one-fourth smaller.

[1] *Se-i-u'rus no-ve-bo-ra-cen'sis.* Length, 6 inches.
[2] *S. mot-a-cil'la.*

THE VIREO FAMILY

Vireonidae

It is quite difficult to point out peculiarities by which the vireos can be distinguished from the warblers. They are placed next to the shrikes because of a supposed resemblance

RED-EYED VIREO.

to those birds in the shape of the upper mandible—hooked and notched. The vireos look so much like warblers that only an expert can distinguish them.

THE RED-EYED VIREO[1] is distinguishable at close range by its red eye with a white line over it, and the WHITE-EYED VIREO[2] also is marked by the white color of its eyes. Both are fairly good songsters, and the former is about as "do-

[1] *Vir'e-o ol-i-va'ce-us.* Length, 6 inches.
[2] *V. no've-bo'ra-cen'sis.* Length, 5 inches.

mestic," in its habit of frequenting the haunts of man, as the yellow warbler. The former ranges from New York northwestward across the continent, the latter only as far as the Rocky Mountains.

THE SHRIKE FAMILY

Lanidae

The Great Northern Shrike, or Butcher Bird,[1] is a bird of very striking personality. In appearance he is a high-headed, well-dressed dandy. In disposition he is to-day a fierce little bird of prey, feeding solely upon flesh food; but to-morrow he will change into a modest insect-eater. It seems very odd to find a bird of prey among the Perching Birds.

The Butcher Bird is a bird of the North, breeding from Labrador to Alaska and visiting the United States only in winter, when it is almost impossible to obtain food at home. The species which we find in the United States in summer is the Loggerhead Shrike,[2] which closely resembles its northern relative, both in form and habits.

In the fields you can easily recognize a Shrike by his bluish-gray back and large head. His strong, hooked beak has a notch, or tooth, near the end of the upper mandible. He is deliberate and dignified in his movements, and, like the true sportsman that he is, he is happiest when hunting. He catches and feeds upon small frogs, mice, small snakes and even birds (so it is said), and has the odd trick of hanging up, impaled upon a thorn, dead game which he cannot eat as

[1] *La'ni-us bo-re-al'is.* Length, about 10 inches. [2] *L. lu'do-vi'ci-an'us.*

soon as caught. Once I saw a Butcher Bird seize a large field mouse out of a freshly upturned furrow, and fly away with it, struggling vigorously. The mammal was so large and heavy it was surprising to see the bird bear it away. Many times I have seen dried frogs hanging upon thorns, where they had been placed when fresh by Shrikes.

LOGGERHEAD SHRIKE.

Every Shrike is a feathered Jekyll and Hyde. In summer and autumn his harvest of insects is everything that could be expected. In Dr. Judd's Bulletin No. 9, Biological Survey, Department of Agriculture, the list of groups of insects destroyed by the Loggerhead Shrike fills a page, and includes such pests as caterpillars, cut-worms, canker-worms, grasshoppers, crickets and weevils.

But mark the winter and early spring record. Thirteen species of small birds are numbered among the Loggerhead's victims, of which five are sparrows, and others are the ground dove, chimney swift, Bell's vireo and snow bunting. The Butcher Bird is known to kill twenty-eight species of birds, some of them valuable insect-destroyers, and none of them to be spared without loss except the English sparrow. On the other hand, this bird is a great destroyer of wild mice, which in cold weather form one-fourth of its entire food.

The Loggerhead also feeds freely upon lizards, snakes, frogs and fish, when they are obtainable. The Butcher Bird is a deadly enemy of the English sparrow, and kills and eats them so industriously that in Boston certain city officials once felt called upon to order the Shrikes to be shot.

The table on the opposite page is a very full exposition of the food habits of the two members of the Shrike Family referred to.

The Great Northern Shrike is able to sing, but seldom does so; and many of his friends think he sings not at all. In summer it ranges all the way to Cook Inlet, Alaska, and in winter it migrates as far south as Virginia. In the southern states it meets the Loggerhead Shrike, and the two species so strongly resemble each other that they are like two feathered Dromios.

THE WAXWING FAMILY

Ampelidae

The Bohemian Waxwing.[1]—Once, on a certain cold and bleak Thanksgiving spent on the banks of the Musselshell River in Montana, when the mercury stood at 8° below zero and the face of nature was a "gray and melancholy waste," a flock of birds settled in the top of a dead cedar that stood near our camp. They were like so many exquisite gems, found ready cut and polished in a desert of rocks; and the whole camp quickly turned out to admire the exquisite creatures at short range. They were Bohemian Waxwings.

I think that the Bohemian Waxwing, when alive and in

[1] *Am-pel'is gar-ru'lus.* Length, 8 inches.

TABLE SHOWING PERCENTAGES OF PRINCIPAL ELEMENTS OF FOOD OF THE BUTCHER BIRD AND LOGGERHEAD SHRIKE, CALCULATED BY VOLUME

By Sylvester D. Judd, United States Biological Survey. Bulletin No. 9

NAME											MONTH	
Butcher Bird	77	23	22	55		8	3	1	6	4	1	.....	33
Loggerhead..	76	24	53	14	7	13	1		2	4	6	Dec., Jan. and Feb.	14
Butcher Bird	77	23	46	31		9	1	3	5	3	2	.....	17
Loggerhead..	20	80	9	9	2	24	9	4	11	14	18	March and April.	16
Loggerhead..	11	89	3		8	71	3		4	7	4	May and June	17
Loggerhead..	2	98			2	67	2	4	1	5	19	July, Aug. and Sept.	22
Butcher Bird	27	73	11	16		57	4		6	4	2	.....	17
Loggerhead..	10	90		10		50	5	7	3	13	12	October and Nov.	19
Butcher Bird...	60	40	26	34		24	3	2	6	4	1	Average Oct. to April, inclusive.....	67
Loggerhead.....	28	72	16	8	4	39	4	3	4	9	13	Average for the whole year	88

perfect plumage, is one of the most exquisite perching birds I know. It is not gorgeous or resplendent; but in dainty prettiness of form, immaculateness of plumage, and delicate

BOHEMIAN WAXWING.

refinement in color scheme, combined, it has few equals. The red wax-like tip on the end of each secondary feather gleams like a ruby. No picture of this bird ever can fairly portray its beauties. The CEDAR WAXWING or CEDAR BIRD[1] of the eastern United States is but a fair understudy of its more robust and also more beautiful brother of the Northwest and

[1] *A. ce-dro'rum.* Length, about 7 inches.

the Far North. Any one can instantly identify one of these birds by its jaunty top-knot, and the little drops of vermilion wax on the tips of its secondaries, eight on each side.

THE SWALLOW FAMILY

Hirundinidae

The members of the Swallow Family are among the most sociable of our feathered friends, and also the most conspicuous. Of all the birds that are known to feed upon and destroy the deadly cotton-boll weevil of the South, and other weevils also, the Swallows and Martins are the most effective. In view of the *millions* of dollars annually lost to the cotton-planters of the South through the boll weevil, it is amazing that in portions of the South some of these birds are shot by alleged "sportsmen," for sport.

The Purple Martin[1] loves the little house atop of a tall pole, which the country boy who loves birds takes pleasure in erecting for it. Forty years ago thousands of the prairie farms of the middle West bore these tall monuments to the love of wild birds which *is born in every right-minded boy!* And how gracefully the glossy-black Martins used to circle and swoop and gyrate about them. Sometimes the bluebirds took possession of the martin-boxes, and then George or John was troubled; for having designed and erected on high a dwelling especially for the Martins, it seemed morally wrong that they should be forestalled, or crowded out.

And then came Ahab, the English sparrow, a homely,

[1] *Prog'ne su'bis.* Average length, 8 inches.

quarrelsome, low-minded and utterly uninteresting little wretch, a gutter-rat among birds. Unless coerced with a shotgun, he steals the nesting-boxes of all other small birds, driving before him the Martins, bluebirds and many others who used to love our company. In the North the Purple

PURPLE MARTIN

Martin does not seem to thrive away from the haunts of man, and from many localities it has totally disappeared.

The disappearance of this bird from the North is no doubt partly due to the domineering English sparrow, but what probably is the chief cause of its local extermination has already been pointed out—its slaughter for sport and as "food." In many portions of the North efforts are being made to induce this charming farm bird to return in something like its former numbers.

CLIFF SWALLOW AND NESTS.

Nests under eaves of log house, photographed by E. R. Warren.

THE EAVE, or CLIFF SWALLOW[1] is still more sociable than the purple martin, and also more enterprising. With complete confidence in man's good will toward the bird world, it chooses a barn that is big and high, and prosperous-looking, and calls it home. From the edge of the nearest pond it brings pellets of mud, and sticks a lot of them in a solid circle, against the outside wall of the barn, and close up under the eaves. Upon this, working most industriously to finish before previous layers have had time to dry, the cup-shaped nest is built out, pellet by pellet. At the last, the cup is narrowed down to a tube barely large enough to admit the bird, and the opening thrusts out into the air, usually tilted slightly upward.

BARN SWALLOW.
Hi-run'do e-ryth'ro-gas-tra.

All the members of a flock of Swallows build close together, nest joined to nest very frequently, and thus depends a most interesting Swallow town, usually called a "colony." Surely, any one who is not pleased and cheered by their sweet chattering and chirping under the eaves is "fit for treason, stratagems and spoils." Their flight is poetry expressed in motion. In catching the insects which constitute their food, they love to skim close to the surfaces of ponds and streams.

[1] *Pet-ro-chel'i-don lu'ni-frons.* Length, 5.75 inches.

Nature has developed the members of the Swallow Family to catch insects in mid-air, where very few other birds can successfully pursue the flying pests. For this reason, if for no other, all these birds should be most rigidly protected, and encouraged by all the blandishments known to bird-lovers.

There are three Swallows which so much resemble each other that it requires a reference to a good handbook of birds to identify them. These are the Cliff, Bank and Tree Swallows. The Barn Swallow can be distinguished from these three by its very long and deeply forked tail, the tails of all the others being rather short.

THE TANAGER FAMILY

Tanagridae

The male Scarlet Tanager[1] is one of the most showy small birds of our American Passeres. Excepting its wings, which are jet black, its entire plumage is of a clear scarlet hue, as bright as the brightest ribbon. There is no precious stone which compares with it, for beside it the ruby is dull. The cardinal grosbeak is not nearly so bright as the male Tanager.

Wherever seen, the male Scarlet Tanager fixes the attention of the observer, and challenges admiration. It is an early spring arrival from the South, and in Washington, D. C., I have seen it in the parks while the trees were yet leafless. Some of those which come annually to the Zoological Park,

[1] *Pi-ran'ga e-ryth-ro-me'las.* Length, 6.50 inches.

New York, feel so secure in our protection that they permit their admirers to approach within ten feet of them.

The female of this species is widely different in color from the male, being dull olive-green above and greenish yellow below.

SCARLET TANAGER.
Male and female.

THE FINCH AND SPARROW FAMILY
Fringillidae

This Family is a large one, and it embraces the perching birds with strong beaks, such as the finches, sparrows, snowbirds and their near relatives, and one group of grosbeaks. By their beaks you shall know them—short, and wide at the base, like the jaws of a pair of pliers. They are made for cracking all seeds which the owner does not wish to swallow entire.

The American Cross-Bill[1] is a dull-red bird with brown wings and tail, and its bill is so emphatically crossed it seems like a deformity which must necessarily be fatal to a seed-eater. But Nature has her own odd ways; and it seems that the scissor arrangement of this bird's beak is to promote the husking of pine cones and the cracking of the seeds.

This is a bird of the North, and in the East comes no farther south than a line drawn from Colorado to Washington, D. C. In the West it descends to Arizona, but everywhere in the United States it is only a winter visitor. With an opera-glass it is always easily recognized by its crossed bill.

The American Goldfinch[2] is a conspicuously yellow bird, though quite small. It is a plump-bodied, fluffy little bird, all sulphur yellow except a circular black cap atop of its head, and black trimmings on its wings and tail. It is exquisitely pretty, and, like a feathered coquette, loves to pose on the steep side of a tall mullen stalk, with no leaves about to cut off the admirers' view. It is sociable, also, and loves the garden, orchards and meadows of the self-elected "lord of creation," man.

As a weed-destroyer, this bird has few equals. It makes a specialty of the seeds of members of the Order Compositae, and is especially fond of thistles, ragweed, wild lettuce and wild sunflower. (Sylvester D. Judd.)

[1] *Lox'i-a cur-vi-ros'tra minor.* Length, 6.50 inches.
[2] *As-trag-a-li'nus tris'tis.* Length, 5 inches.

The Snow Bunting[1] comes down from the far North, in the dead of winter, when the snow falls fluffy and deep, and

AMERICAN GOLDFINCH.

the song-birds of summer are basking in the sunshine of the South. They do not appear every winter, however. In fifteen

[1] *Pas-ser-i'na ni-val'is.* Length, 6.50 inches.

years I never have seen even one in the Zoological Park, but I hear that they do occasionally appear in southern New York. They come in flocks of from ten to twenty birds, and settle in the snow as if they loved it. But for a few dark streaks on back and wings, they are the color of snow, and generally have the plump outlines which betoken good feeding and contentment.

SNOW BUNTING.

When you see this bird, remember that it belongs to *the polar world*, quite as much as the arctic fox and musk-ox, and in summer it goes to the "farthest North" on our continent. Rarely indeed does it breed in even the most northerly portions of the United States, and seldom enters a southern state.

In winter the food of this pretty bird consists chiefly of the seeds of weeds that send tall fruit-stalks above the level of the snow. In our park grounds we scatter wheat for it, on the tops of granite ledges from which the wind has blown the snow, but it is only the juncos and jays and a few other birds that come for this food.

THE SLATE-COLORED JUNCO,[1] often called the SNOW BIRD, is also a bird of the snow-fields; but it is a home product rather than a visitor from the desolate Barren Grounds. When seen on snow, its slaty-blue back makes it appear like

[1] *Jun'co hy-e-mal'is.* Length, 6 inches.

a dark-colored bird, but underneath it is dull white. Like the snow bunting, it goes in small flocks, and in winter feeds chiefly upon weed-seeds and grain. It breeds in our northern states, and in winter migrates southward almost to the Gulf of Mexico. Altogether, thirteen species and varieties of Juncos are recognized in North America, and they are at home all the way from Alaska to Mexico and the Gulf. During the long snow spell of February, 1914, eighteen Juncos, four blue-jays and two white-throated sparrows fed at the bird's table just outside my office window.

THE SPARROWS.—There was a time when in America it was not only respectable but even honorable to be a Sparrow; but during the past twenty years the doings of one alien species, most unwisely introduced here, have tended to bring the name into disrepute. How our native species must hate the interloper! But we protest that our native Sparrows are as sweet-voiced and interesting as ever they were; and as wholesale destroyers of noxious weeds they are unsurpassed. After a careful investigation of the quantity of weed-seeds consumed in Iowa by the TREE SPARROW,[1] Professor F. E. L. Beal calculated the total amount for one year to be 1,750,000 pounds, or about 875 tons! Practically without exception all our Sparrows are diligent consumers of the seeds of noxious weeds.

If you doubt the vocal powers of Sparrows go with me to the country roads, and listen for three minutes to the delicious melody that pours from the quivering throat of a SONG SPARROW.[2] When he feels well he will perch on the top of a

[1] *Spi-zel'la mon-ti-co'la.* Length, 6 inches.
[2] *Mel-o-spi'za fas-ci-a'ta.* Length, 6.50 inches.

hedge, secure a good grip on a comfortable twig, point his beak skyward at an angle of sixty degrees and sing as if trying to burst his little throat. Mrs. Mabel Osgood Wright justly calls him "the darling among the song-birds," and "the most constant singer among our northern birds." In some localities, at least, they sing all summer long. In Iowa I have heard them a thousand times, bravely piping and trilling in the sweltering heat of July and August, when other birds were silent, and have been moved to wonder at the amount of energy stored up in their little bodies.

I think the best way to identify this bird is by its singing. Pick out the sparrow in gray and brown which sings to surpass all others, and it will be a Song Sparrow. Its home is the eastern half of North America, from northern Manitoba to Mexico. West of the Rocky Mountains it becomes the *Mountain Song Sparrow*. In the southwestern deserts it grows pale—to match its environment—and becomes the *Desert Song Sparrow*. There are thirteen species of the Song Sparrow genus—or at least that number have been described, and Alaska is yet to be heard from.

The White-Throated Sparrow[1] is the species which comes next in general attractiveness. It is a very pert and pretty bird—for a sparrow, and its oddly marked head is easily identified. It wears a white goatee and a black cap, and on the latter is laid a broad arrow, in white. A white line comes down along the centre line of the head, and another comes forward over each eye, until the three come together at the base of the upper mandible. The song of this bird

[1] *Zo-no-tri'chi-a al-bi-col'lis.* Length, 6.50 inches.

is pleasing, and nearly every self-respecting ornithologist translates it into English to suit his or her fancy; but, to tell the truth, the White-Throat never will win a prize as a great singer.

WHITE-THROATED SPARROW.

THE ENGLISH SPARROW.[1]—Let me dip my pen in blue vitriol; for my temperature rises at the thought of writing the name. Daily we see the unclean little wretches grubbing in the filth and microbes of the street, where no American bird will humble itself to feed. After thirty years of acquaint-

[1] *Pas'ser do-mes'ti-cus.* Length, about 6 inches.

ance I am obliged to say that I never saw one catch a worm, a caterpillar, or an insect of any kind. When the elm trees are loaded with tent caterpillars, an English Sparrow will let them crawl all over him, and not kill one. Instead of ranging out into the open fields and hunting for clean weed-seeds, this bird revels in the foulest dirt of the street. It does, however, manage to eat the seeds of the dandelion, when the heads are filling, in April and May.

The English Sparrow is not beautiful, either in form or plumage, and it cannot sing a note. Its tastes are low and vulgar. It is quarrelsome, and crowds out many other species of small perching birds. In Cheyenne, Wyoming, when Mr. Frank Bond killed all the English Sparrows, and kept them killed, other perching birds flocked into the city in great numbers, and many species bred there. The more persistently these interlopers are killed off, the better for all other birds. They can be made to serve well as subjects for dissection in the schoolroom, and for amateur taxidermists; and they make excellent food for captive hawks, owls, small carnivores, and live snakes of several species.

The introduction of this bird may well serve as a solemn warning against any further meddlings with Nature on that line. In the first place, there never existed the slightest reason or need for this importation. Without serious consideration, or consultation with the persons most competent to advise, this bird was imported and planted in twelve widely separated localities in the United States. To-day it is a feathered nuisance that spreads over one-half the United States, and excepting locally cannot be abated. Neverthe-

less, it is within the power of western towns and cities wherein it has not yet gained a foothold to follow the example of Mr. Bond in Cheyenne, and destroy every colony that enters before it has time to breed.

THE CARDINAL, or CARDINAL GROSBEAK,[1] also called the CARDINAL REDBIRD, is the pride of the South. From New

CARDINAL.

Orleans to New York it is persistently trapped and "limed"—not to "keep" as a cage bird, but to *sell* as such. Poor, unhappy Cardinal! How much better its fate had it been created black instead of bright cardinal red, with no jaunty top-knot, and no fatal gift of song!

In a cage six by nine feet, or even four by four, a bird like this flies to and fro, and in company with a dozen other small

[1] *Car-di-nal'is car-di-nal'is.* Length, 8.50 inches.

birds finds life far from full. But if you put a wild song-bird in a cage barely large enough for a canary, the bird is wretched, it dies soon and the keeping of it is a sin against Nature. Excepting canaries and a very few other species, if you cannot keep birds (and mammals, also) in big cages, *do not keep them at all!* The way thousands of song-birds are caught in some portions of the South, to sell as cage birds, is a sin and a shame. At this date New Orleans in particular has before her an imperative duty in breaking up this business. Children everywhere should be taught that it is *almost impossible for any one save an expert bird-man to take young song-birds and rear them successfully.* Young insectivorous birds require specially compounded bird-food, and it must be given to them *every hour,* with small forceps—a very tedious operation.

In the kindness of their little hearts, children often take young song-birds from the nest, cage them, and try to feed them on what some little folks like best—cake and cream! They might as well give them poison! For any one ignorant of the precise methods necessary in rearing insectivorous birds to take such birds from their parents is *cruelty and destruction!*

The sight of a wild Cardinal always compels attention. The bird is not only beautiful in color, but it is aristocratic in form and manner. It comes up from the South into New York state, and the Ohio River region, and extends westward to the edge of the plains region.

The Rose-Breasted Grosbeak[1] is, in all respects save one, a very beautiful bird. It has a big, clumsy-looking, con-

[1] *Zam-e-lo'di-a lu-do-vi-ci-an'a.* Length, 8 inches.

spicuously white beak, which almost spoils the whole bird. But the pink-sunset flush on the clear sky of its breast, its glossy-black head and tail, and black-and-white wings, are so beautiful a combination they lead one to forgive the homely

ROSE-BREASTED GROSBEAK.

beak. The delicate pink-rose tint on the breast renders the identification of this bird very easy, even at first sight.

I must confess that I remember nothing of the Grosbeak's song, and that it made no impression on me, even when these birds were around me. Certainly it has always seemed to me that it is no great singer, not more than third-rate, at the best, or its song would be more in evidence. On the other

hand, Mrs. Mabel Osgood Wright warmly contends that the song of the Grosbeak is both sweet to hear and abundant in volume. It is celebrated as an enemy of the potato-bug, and it feeds omnivorously upon other insects, buds, blossoms, seeds and fruit.

The range of this species is bounded by the great Rocky Mountain barrier. Westward thereof is found the *Black-Headed Grosbeak*, and the arid lands of Texas, Arizona and southern California are inhabited by the *Western Blue Grosbeak*.

The bluest bird that flies in North America is the INDIGO BUNTING,[1] a trim little craft, built and rigged like a warbler, and of warbler size. Like the ocean, it is

Deeply, darkly, beautifully blue,

—not the sky-blue of the jay, but like indigo. In the East you cannot possibly mistake it. The deep-blue bird of the Far West is the *Lazuli Bunting*, our bird's nearest relative.

THE BLACKBIRD FAMILY

Icteridae

This Family includes several showy species of birds which are very much in evidence, and quite generally known to country dwellers. Five representative and very interesting species will be noticed.

THE BOBOLINK[2] is a bird with two very distinct characters. It has a name and a suit of feathers for the North,

[1] *Cy-a'no-spi-za cy-a'ne-a.* Length, 5.50 inches.
[2] *Dol-i-cho'nyx o-ry-ziv'o-rus.* Length, 6.75 inches.

another suit and another name in the South; and it has three reputations.

When in springtime a certain jolly and vigorous little song-bird comes up from the South, he puts on a dress-suit of marvellous design, in black, white, brown and gray, as shown opposite the page following. He is then a regular swell, and his name is Bobolink. His mate, however, is a plain little bird, clad in yellowish brown, with slight trimmings of yellow and white. They frequent the marshes and low meadows, nest on the ground, and rear from five to seven young.

That accomplished, the male bird doffs his pretty spring suit, acquires plumage like that of the female, and then they go South. There they become Rice Birds, and years ago, when there were great rice-fields in the Carolinas, they raided those fields for rice, and grew fat. Then came the Man-With-a-Gun; and the birds fell easy victims. The birds were shot for two reasons: The rice-planters found them a nuisance in their fields, and many people think Rice Birds are good eating.

Those conditions led straight to a very deplorable result. Although the rice-fields of the Carolinas are practically gone, the old status of the Bobolink as a game bird still persists, and wherever the shameless state laws permit it that beautiful song-bird is persistently shot by "sportsmen" as game. This is an outrage, and it must be terminated as quickly as possible.

Consider the "Reed Bird on toast," or, worse still, "on a skewer." It is a trifle too large for one mouthful, but by no means large enough for two. A healthy, able-bodied

American at work upon this two-ounce bird with a ten-inch knife is a sad but impressive spectacle. It is to be hoped that it will be long ere the people of this country really have cause to turn to this tiny song-bird—*or any other song-bird*—as a source of food with which to satisfy hunger. How can any self-respecting man deliberately order so pusillanimous a dish as "Reed Birds on a skewer"? There is a land so populous and poor that its people eat sparrows because they need them for food; but it is far from America.

The Bobolink is really a very acceptable singer, and has furnished a theme for several poets, of whom Bryant was the most celebrated.

The Common European Starling,[1] recently introduced at New York, is now spreading rapidly from its port of entry and it is a bird not to be ignored. It is a short, thick-set blackbird. In winter the male is marked by fine spear-points of light buff, and a nearly white beak. In summer the plumage of this bird is "black, brilliantly shot with purple-green and steel blue." In winter this bird is conspicuous by the fact that it lives in flocks, does not go South, and it pipes up with a cheery whistle that quickly attracts attention. They are bold and confident, and cheerfully invite themselves to enjoy the hospitality of city parks and back yards.

Already there are numerous complaints that this Starling boldly drives woodpeckers and other birds out of their long-established nesting-places. Many American bird-lovers declare that already this bird is a nuisance, and in New York it has purposely been omitted from the list of protected birds.

[1] *Stur'nus vul-gar'is.*

THE BOBOLINK IN SPRING ATTIRE.

My own opinion is that for the present the Starling is on trial, and the evidence submitted is not sufficient either to condemn it or to indorse it. If it persistently harries and drives from their haunts any important contingent of our native insectivorous birds, then the Starling will have to be suppressed by shooting.

The Red-Winged Blackbird[1] is a bird that delights my soul. No marsh or cat-tail swamp is complete without him. No spring ever can be perfect without his sweet, liquid gurgle—"O-ka-leé." You hear that flute-like call when the sky is clear, the warm sunshine is flooding field and stream, and you are glad that you are alive.

RED-WINGED BLACKBIRD.

The jet-black plumage of this bird, with epaulettes of scarlet and white, make a brave show among the dull-green blades of the cat-tails. As a rule, bird songs translated into English do not appeal to me very strongly; but the Red-Wing does say "O-ka-leé" to perfection!

The typical Red-Wing is an eastern bird, but its half-dozen subspecies are so well dispersed throughout the United States that almost every region possesses one. In New York City it lives outdoors all winter, when properly sheltered

[1] *Ag-e-lai'us phoe-ni'ci-us.* Length, 9 inches.

and fed, and sings joyously all winter long. This means that in a wild state this bird, like hundreds of other species, migrates southward in autumn because it cannot find food in winter in lands of snow and ice.

The Yellow-Headed Blackbird[1] is a very conspicuous species throughout the West, from Indiana almost to the Pacific. Its entire head, neck and breast are of a dull-yellow color, but elsewhere it is wholly black, save a white patch on the wing. In Montana it is very common in summer.

The Meadowlark[2] is one of the most trustful and sociable of our birds. As its name implies, it is partial to open grass-lands, and its favorite hunting-grounds are the bits of waste land in sloughs (called "*slews*" in the West), that are full of low weeds. This bird does not like tall grass or weeds, for it is very curious to know all that is going on in the world about it. It is an indifferent flier—slow and short—and manifests a decided preference for the haunts of man.

The Lark contributes much to the pleasures of life on a farm. Its bright-yellow breast and throat, with a jet-black neck-scarf, are as cheerful as an April sunburst. The long, conical beak, rather long legs and erect carriage of this bird give him an air of cheerful confidence which says to you, "I'm a good fellow, and you're another!" His song is nothing to boast of, but he always pipes up cheerfully, and does the best he can. I always liked this bird, and count him as one of the dear friends of my boyhood. To me, his plumage is beautiful, especially when seen on a fresh, dewy morn-

[1] With an apology to the reader, it is stated that the Latin name of this bird is *Xan-tho-ceph'a-lus xan-tho-ceph'a-lus;* and its length is about 9 inches.

[2] *Stur-nel'la mag'na.* Length, about 10 inches.

ing, when the sun is newly risen, and the song-birds are greeting the new day.

According to the investigations of the Biological Survey, the Meadowlark is one of the most valuable of all birds that

MEADOWLARK.

frequent farming regions. Throughout the year, insects make up 73 per cent of its food, grain 5 per cent, and weed-seeds 12 per cent. During the insect season, insects constitute over 90 per cent of this bird's food supply. As a destroyer of insects and weeds, this bird is entitled to the most perfect protection that laws and public sentiment combined can afford.

In Montana, the WESTERN MEADOWLARK[1] quite wearied me by the tiresome iteration, day after day, of its one short, seven-word song. This was it:

As our "outfit" pulled over the smoothly shaven Missouri-Yellowstone divide, in the month of May, I think we heard that song repeated a thousand times, or less; and when the wind blew hard for five long days without intermission, even that cheerful welcome at last became irritating.

The eastern Meadowlark inhabits the eastern half of the United States, and the western species begins at the western edge of Iowa and Missouri; *but neither of them belongs to the Lark Family!*

THE BALTIMORE ORIOLE,[2] or HANG-NEST, has beautiful plumage of orange and black, a very pleasing song, good habits, and therefore it is one of our feathered favorites. Either when perching or on the wing, it is a very graceful bird. It is the most skilful builder in North America, and constructs a strong and durable hanging nest which is a marvel of intelligent and skilful effort. The Oriole does not believe in having boys make collections of Oriole eggs. The outermost branches of a very tall and very drooping elm are particularly suited to its views of an ideal building site.

The nest of this Oriole is bound to create in the mind of any one who examines it attentively a high degree of admiration for the mental capacity of its builder. Its superstruc-

[1] *Stur-nel'la neg-lec'ta.* Average length, about 9.50 inches.
[2] *Ic'te-rus gal-bu'la.* Length, 8 inches.

ture is composed very largely of long, spring-like horse-hairs, so tightly woven together that even when the end of a hair waves freely in the air, it is impossible to pull it out. Here

BALTIMORE ORIOLE AND NEST.

is genuine *weaving,* done with hair and fibrous fragments of soft, weathered bark. Let it be remembered at this point that not even the higher apes know how to *weave* a nest or a roof.

The mouth of the Oriole's bag-like nest is thin but strong, and terminates in an edge as thin and firm as haircloth. A nest now before me is five inches long, four inches in outside diameter at a point half way between bottom and top, and its opening is two inches in diameter. For a space of two inches, the horse-hairs of the upper margin are wrapped around an elm twig the size of a slate-pencil. *At no point* are the walls more than a quarter of an inch in thickness, and the inside is as symmetrical and shapely as if the nest had been woven around a form.

The usefulness of the Baltimore Oriole is fully equal to its beauty. As a destroyer of caterpillars it has few equals among birds. In May, insects constitute 92 per cent of its food, and in April and July 70 per cent. For the entire year, animal food, chiefly caterpillars and beetles, constitute 83.4 per cent of its food, and vegetable matter the remainder of 16.6 per cent.

The Purple Grackle, or Crow Blackbird,[1] has prompted scores of persons to ask, "What is the name of that very shiny, jet-black bird with a long tail?" No wonder it attracts attention, especially in contrast with the lustreless rusty blackbird. Its color is deep purple-black, and it is as shiny as if it had been varnished all over. It loves to follow the plough, and pick up the big, fat grubs that are exposed to view, before they have had time to burrow out of sight. Often in their eagerness not to miss a chance, these birds will approach within ten feet of the plough-handles. It is then that one notices that their eyes are light yellow, and

[1] *Quis'ca-lus quis'cu-la.* Length, about 12 inches.

very odd-looking. This bird has no song, and its sign of contentment with life is like a great asthmatic wheeze. The tail of this bird is creased lengthwise along the middle, or "keeled."

Prior to the systematic investigations of the Department of Agriculture the value or harmfulness of the Crow Black-

PURPLE GRACKLE.

bird was in dispute. The examination of two thousand three hundred and forty-six stomachs revealed that during an entire year the food supply of this bird is made up in the following percentages: insect food, 26.9; other animal food, 3.4; corn, 37.2; oats, 2.9; wheat, 4.8; other grain, 1.6; domestic fruit, 2.9; wild fruit, 2.1; weed-seed, 4.2; mast, 14; total, 100. "The charge that the blackbird is an habitual robber of birds' nests is disproved by the stomach examinations." (F. E. L. Beal.)

THE CROW FAMILY

Corvidae

Take them all in all, there is no Family in the whole Order of Perching Birds whose members have more striking individual traits, or more commanding personality than the Family which contains the ravens, crows, jays and magpies. All these birds are bold and conspicuous, and fond of entering into the affairs of man. The crow feels it to be his duty to assist in planting operations. The blue-jay robs you, and scolds while he does it. The magpie will hold a fifteen-minute conversation with you, and tell you of all his troubles. Go where you will in the United States, some of the twenty species of birds of this Family will cheerfully bear you company.

The American Magpie,[1] of the somewhat "wild West," is a beautiful and showy bird, and in winter it bravely strives to adorn the bare and bleak valleys, foot-hills, divides and mountain sides of the Rocky Mountain region. In the whole of the West, I know of no bird more beautiful in flight than this. Its plumage is half glossy-purple black, and half snow white; and this, with its long tail streaming after it in its flight, makes it a very striking object. In winter the absence of other birds renders the Magpie trebly conspicuous and welcome. Its flight is slow, dignified, and as straight as an arrow.

The Magpie is fatally fond of fresh meat, and many a fine bird meets its death by devouring poisoned meat laid

[1] *Pi'ca pi'ca hud-son'i-ca.* Length, about 18 inches.

AMERICAN MAGPIE.

out for wolves. If hospitably received, this bird will come close to the haunts and camps of man, investigating everything, and looking for scraps of food. If not fired at, it soon becomes very friendly, and a small cabin easily becomes the haunt of a score of birds. Some of those in the Flying Cage of the New York Zoological Park are at times as amusing as monkeys. They come close up to the wires, and when the visitor bends down, to listen or converse, they actually *talk*—in their language. In low, confidential tones they tell of their fear of the big condor, the painful pecks they get from the herons, and the greediness of the ducks in devouring all of their kind of food.

In the days of elk and buffalo slaughter, the Magpies feasted continually upon fresh meat. Now they make friends with the ranchmen, and eat all kinds of food. This interesting bird ranges from Alaska, and the edge of the arctic barrens, southward through the great plains and mountains to the arid regions of the Southwest. It is easily kept in confinement, if provided with a large cage and a suitable house, *out-of-doors.*

In thickly settled farming regions, in its natural geographic range, this bird becomes a serious pest. It devours eggs, small chickens and ducklings and fruit, and is greatly disliked. It should not be introduced into any farming region from which it is naturally absent.

THE BLUE-JAY[1] needs no description—only toleration; for his reputation would be all the better for washing. He is a bird of unbounded assurance, and being well known as a

[1] *Cy-an-o-cit'ta cris-ta'ta.* Length, 11.50 inches.

marauder, it is only his audacity which saves him from extermination. Externally, he is really a beautiful bird, but his voice is strident and unmusical.

Beside his harsh "Jay," a crow is a sweet songster. He will take your cherries right before your eyes, and then scold

BLUE-JAY.

you roundly for not looking pleasant about it! He robs the nests of other birds, eating eggs or young, whichever may be there; and to that extent he is a pest. During the closed season on eggs and young nestlings, he lives on insects—until berries and small fruits ripen. If Jays were as numerous as English sparrows, it would be necessary to reduce their number; but they are not so numerous or so destructive that we need to attack them.

Steller's Jay[1] is one of the handsomest birds of the moist and dark forest region of the Pacific coast, which ex-

[1] *Cy-an-o-cit'ta stel'ler-i.* Length, 12.50 inches.

tends from Mount St. Elias to San Francisco Bay. It is also the type of three subspecies, or varieties, found farther east and south. It is the Pacific coast counterpart of our blue-jay—high-crested, barred with black on wings and tail, and with blue as its prevailing color.

The Piñon Jay[1] (pronounced pin'yone) is a bird well worth knowing. On the Sierra Nevada mountains and adjacent plateaus, where the piñon pine, juniper and cedar bravely struggle against the scarcity of water, and only half-clothe the rugged nakedness of Nature, this Jay is a welcome habitant. I think it safe to say that you will find it wherever you find the piñon pine, whose big, husky cones furnish a generous quantity of seeds, called "nuts," which are good for man, and grand food for all the wild creatures that can crack their delicate shell.

I have never seen the Piñon Jay so numerous that it could be called a "common" bird throughout an extensive region. At the same time, it is a bird of social habit, and given to flocking, quite like our eastern crow. It is really a connecting link between the crows and jays. It has a short, square tail, no crest or "top-knot"; its predominating color is grayish blue, and its cry is a crow-like "*caw*."

Clarke's Nut-Cracker[2] is a bird of the western mountain tops and canyons, and a companion of the mountain sheep. Wild creatures that love to dwell on high mountains, amid grand scenery, appeal to my sympathies more strongly than some others. To me, this bird recalls pictures of moun-

[1] *Cy-an-o-ceph'a-lus cy-an-o-ceph'a-lus.* Length, 11 inches.
[2] *Nu-ci-fre'ga co-lum-bi-an'a.* Length, 12 inches.

tain parks, "rim-rock," "slide-rock," pines and cedars bravely climbing up steep acclivities, gloomy canyons and rushing streams of icy-cold water below all.

I first made acquaintance with this bird while hunting elk and mountain sheep, on a fearfully steep mountain side, with a magnificent panorama spread out below. It greeted me in friendly fashion with the rasping "Kurr, Kurr!" which, when heard amid such surroundings is not soon forgotten. It has been my misfortune, however, never to see the remarkable habit thus graphically described by Mrs. Florence Merriam Bailey in her delightful "Handbook":

"Living mainly on the crests of the ranges, the birds fly to the high peaks to get the first rays of the sun, and when warmed go for food and water to the lower slopes. Their method of getting down is startling at first sight. Launching out from a peak, with bill pointed downward and wings closed, they drop like a bullet for a thousand feet, to the brook where they wish to drink. Sometimes they make the descent at one long swoop, at other times in a series of pitches, each time checking their fall by opening their wings, and letting themselves curve upward before the next straight drop. They fall with such a high rate of speed that when they open their wings there is an explosive burst which echoes from the canyon walls."

The head, neck and body of this bird are uniform ashy gray, and the wings and tail are black, with a white patch half way down the former. The Nut-Cracker is really a small crow, twelve inches long, and much resembles the common gray and black crow of Europe. It is found in all the moun-

tains of the West, from Alaska to Mexico, and straggles eastward to the eastern edge of the Great Plains. It is often called CLARKE'S CROW.

THE CANADA JAY, WHISKEY-JACK, or MOOSE-BIRD,[1] is by reason of its personal oddities and assertiveness perhaps

Photographed by E. R. Warren.

CLARKE'S NUT-CRACKER.

the most conspicuous and widely known of all the perching birds of the great coniferous forests of Canada. Every man who has trailed moose or caribou, or for any reason has camped in the Laurentian wilderness, knows well this audacious camp-follower, and remembers him with interest, if not even friendship. He has no real song, and his cries are rather

[1] *Per-i-so're-us canadensis.* Length, 12 inches.

harsh and strident; but in his native solitudes, where bird sounds are so seldom heard, the voyageur is always glad to hear his call. And surely, every perching bird that chooses to brave the rigors of the northern winter instead of migrating is entitled both to respect and admiration.

The plumage of the Canada Jay has a peculiar fluffy appearance, suggestive of fur. Its prevailing color is ashy gray. The nape and back of the head are black, but the forehead is marked by a large white spot. The wings and tail are of a darker gray than the body. The home of this interesting bird—the companion of the moose, as well as of forest-haunting man—extends from Nova Scotia, and northern New England, throughout Canada to Manitoba, and northward to the limit of the great forests.

The Common Crow[1] needs no description. When finer birds were abundant, we cared little for him; but now that bird life generally has so greatly diminished, we feel like welcoming him as a friend. His cheerful "*Caw*" is a welcome sound, and his services to the farmer overbalance the bad things he perpetrates. The Department of Agriculture, through Professor F. E. L. Beal, has officially investigated him, published the court records of his case, and pronounced him a bird worthy of protection. It is declared, after an examination of the stomachs of specimens, that the noxious insects destroyed by the Crows—cut-worms, caterpillars, grasshoppers and also mice—represent a saving of more grain than the bird consumes.

It must be admitted, however, that the Crow does many

[1] *Cor'vus a-mer-i-can'us.* Length, 18 to 20 inches.

things he should not. He is too fond of eggs, and also of young birds. He will pull up, by the roots, altogether too much newly planted corn; which is very unfair toward the farmer. While the damage is seldom very serious, it is always annoying; and when the Crow passes the limit of human endurance, powder and lead are his portion. For example: when a Crow nesting in Beaver Valley elected to make visits to our duck-pond where young wild ducks were hatching, and take five mallard ducklings in one morning, Curator Beebe was compelled to choose quickly between ducks and Crows, and provide for the survival of the fittest.

THE AMERICAN RAVEN[1] is a bird of the "wild West," quite rare, and seldom seen beyond the mountains. Even when you see it for the first time, you will readily recognize it by its all-black plumage, large size, slow and heavy flight and its hoarse and seldom "*Quock!*" The crow is at all times a cheerful citizen, but the Raven always has a sore throat, and is always going to a funeral.

He lives with Clarke's nut-cracker and the other dwellers on the mountain tops north of the arid regions of Arizona and New Mexico, and nests in the crevices of high, rugged cliffs or canyon walls that are as completely inaccessible as can be found. He is suspicious of all attentions, wants no companions save of his own kind, and mighty few of those. The "*Quock*" of a Raven in a rock-ribbed and gloomy canyon is anything but a cheerful sound.

Like the vulture, this bird feeds upon dead animals, dead fish and sometimes also upon the poisoned meat that wolfers distribute so generously.

[1] *Cor'vus co'rax sin-u-a'tus.* Length, 22 to 24 inches.

THE HORNED-LARK FAMILY

Alaudidae

There is a Lark Family which we regret to say does not include the *meadowlark;* for this separation of birds bearing the same general name tends to create confusion. In Europe the Lark Family is a very large one, and contains about a hundred species, the most celebrated of which is the unfortunate skylark. It is unfortunate because of the wholesale and heartless manner in which it is caught and kept in pitiful captivity as a "cage bird." In London these wretched little creatures are sold by the thousand, sometimes at sixpence each, or even less.

Strange to say, in America the Lark Family is represented by only twelve species and subspecies, of which the HORNED LARK or SHORE LARK[1] is the best type. It is called "Horned" Lark because of a small, pointed tuft or brush of feathers which lies along the side of the head above the eye, pointing backward and thrusting its tip through the regular outline of the back of the head. The resemblance of these points to horns is quite far-fetched, but it seems to have been brought in to stay.

This bird looks very much like a small plover. Our eastern species is by habit a shore bird, whence its second name. It comes to us in winter, in flocks of from six to twenty individuals, and at that season its plumage is not so bright and pleasing as in spring.

The West and Southwest are inhabited by nine sub-

[1] *O-toc'o-ris al-pes'tris.* Length, 7.50 inches.

species of Horned Larks, ranging all the way from Mexico to British Columbia, some of them necessarily living in hot countries, and far from large bodies of water.

THE FLYCATCHER FAMILY

Tyrannidae

There are many little birds, in size next above the sparrows, which look as if they ought to sing; but in reality they do not. They are very expert at catching insects, however, and nothing that flies can escape them in mid-air. These birds make up the Family of Flycatchers, and to the farmers of this country every flycatcher is worth double its weight in pure silver. Altogether there are about thirty species.

The Kingbird,[1] also called the Bee "Martin" and Bee-Bird, may well stand as the representative of this family. Whenever you see a small bird swiftly and actively chasing a large crow in mid-air, darting down upon the back of the black fellow every hundred feet or so, with a peck that sends a thrill of life along his keel, you may know that the gallant little warrior is a Kingbird, and it is driving the crow away from the vicinity of its nest. The performance is like that of a man and a mad hornet. The crow thinks not of battle, but only of getting on in the world, and giving the nestlings of his tormentor a good square mile of crowless space in which to grow.

Look long enough, and you will see the Kingbird return from the chase, perch on his favorite dead limb at the edge of the field, smooth his feathers and renew his watch for flying

[1] *Ty-ran'nus ty-ran'nus.* Length, 8 inches.

insects. Presently you will see him dart from his perch, swoop to a certain point in space, and then return to his place. He has caught some flying insect and, like Oliver, "wants some more."

Never shoot a Kingbird. It is easier to "identify the species" on the wing than lying dead, all shot to pieces. Without killing this most courageous of all birds—which can whip almost anything that wears feathers, but attacks only crows and hawks—you can see that its colors are bluish gray, trimmed with black and white.

The *Crested Flycatcher*, the dear little *Phoebe Bird*, and the *Wood Pewee* belong to the Flycatcher Family.